Students' Coursework Evaluation System (SCES)

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ABSTRACT

Today, information technology has pervaded into almost every industry in the country. Institutions and Universities today are moving towards paperless environment and computerized their current systems to ensure smoother operations in the daily running operation. Students' Coursework Evaluation is introduced as to give a new impulse for the Institution and Universities to gain competitive advantage

Students' Coursework Evaluation System is designed to enable students to access courses information and submit their assignments as well as sitting for online test or quizzes. They can also view the grading of coursework through the World Wide Web. The second purposes of SCES are to enable the lecturers to mark the students' coursework and evaluating the students' performance. SCES is able to provide a comprehensive Web-Based coursework environment for the education industry.

This report introduces the project and provides a description on the topics studied and researched during the literature review. It also describes the software development process that occurred in the project with details on the system analysis and design.

This database system supports the fundamental database operations such as data insertion and data retrieval for administrator, student and lecturer. It is hope that the major problems faced by the current system in one organization can be solved through this system.

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CHAPTER 1 INTRODUCTION

1.1 PROJECT DEFINITION

Students' Coursework Evaluation System or call (SCES) is a web-based application, which contains of a web server and client server. It uses the Internet and browser to present data and retrieve input. SCES is an online coursework evaluation system that consists of small test, quizzes, tutorial and assignments. This system will give immediate feedback to the multiple choice, fill in the blank, true and false questions for small test and quizzes.

Students are able to access and view full information on particular assignments and even the result of test and quizzes through world wide web (WWW), the internet explorer browser. Student assignments are submitted to the relevant lecturers, who grade the assignments by enter the marks through a special designed mark entry interface. Once the marks have been entered, the student can view the assignment's mark on the result page. For the quizzes and test which will be marked online, the students can view their marks right after finishing the quizzes or test.

Lecturers can deal with mark apportionment, new coursework contents maintenance such as test, quizzes and new assignments given. New coursework such as test, quizzes, assignments and tutorial for the relevant courses can also be added. The lecturer can

view the students' assignment and enter the marks through a special designed mark entry interface. Another specially designed interface will allow a lecturer to create the question paper for quizzes and test by selecting the test or quiz questions from the data bank. Lecturers are able to view the performance of each student, course and coursework given.

For security purposes, SCES requires all the users to enter their own username and password. Different test paper will have different login and password. User friendly, performance, reliability and manageability have been considered in order to develop an efficient system and fulfill the needs of the users.

1.1.1 Project Motivation

Currently, students have to travel a long distance to campus for the purpose of submitting the assignments. In the traditional setup, the lecturers have to collect the assignments, given marks and check on students who have not submitted their assignments. During the test and quiz season, lecturers are required to set the test papers. They are required to find questions, checking and arranging the questions as well as typing the questions. After that, the test paper will be finalized and the students will sit for the test in the hall or classroom. Thousands of test papers will be printed out for the test purpose. At the end of the test, all the answer sheets will be collected and the lecturers will need to spend time and energy to mark the test paper with limited time frames. Then, the lecturers need to keep track of all the records from time to time to evaluate the students' performance. However, lecturers are not able to analyse the students' performance instantaneously.

Furthermore, they need to analyse them manually which is time consuming and tiring. All these problem is the prime motivation for the development of this project.

1.2 PROJECT OBJECTIVES

The main objectives of this project is to develop a Students' Coursework Evaluation System (SCES) that:

1. Enables students to have access coursework such as assignments and tutorial continually without constraints of time and location.
    - The WWW is used as the media to achieve the objective as it affords students the opportunity to access the educational resources available and submit the assignments. This system save the students' time as it can be accessed from remote sites and thus do away with the need to travel to campus to submit their assignments.
2. Enables lecturers to maintain the coursework and mark the assignments.
    - Students' assignments are submitted electronically. Therefore, the system is encouraging environment by doing away with paper. Being computerized, the lecturer does not need to bring back a load of assignments to mark at home.
3. Enables lecturers to create web-based test paper easily.
    - The lecturer only need to select the questions from the data bank and the system will automatically arrange the questions in the test paper. The time and energy will be reduced compare to the current written test paper.

4. Enables students to answer the test questions on the web.
    - The quizzes and test will be conducted by using computer terminals only. Students can answer the test questions online without using any stationery but using computer input such as mouse and keyboard.
5. Provide immediate feedback to students at the end of the test or quiz.
    - It is a useful tool for small test or quizzes where as this system will automatically mark the 'objective', 'True and False' and 'fill in the blank' questions and allows the students to view their mark after they submit their answers. This will reduce the lecturers' work and energy by calculates the marks and the point automatically.
6. Provides view result module for the lecturers to do the evaluation of the students' performance and keep track of assessment results.
    - The system can perform the analysis and the students' result will be stored in the database for future reference. With this facility, lecturers can evaluate the students' performance and achievement.

1.3 PROJECT SCOPE

Students' Coursework Evaluation System focuses on online application that can be used in FSKTM. Hence, the targeted users for this system are the students and lecturers of this faculty. All courses information, students information including assignments' marks is displayed on the web at the client site stored in the database at the server site. Online examinations through the web and internet interactivity including forms, web based

discussion groups and real-time chat are not within the scope of this project. This system is divided into three sections:

1.3.1 General Section

This section consists of the security module where as, all the users will be authenticated before they can use the system. Different password will be given to every student during the test or quiz time. There are four modules in this section, which are the change password module, student profile module, lecturer profile module and the FSKTM courses module. The student and lecturer profile module allows the administrator to create the user for using SCES and each of the users will be assigned a username and password. The FSKTM courses module allows the administrator to add, edit and delete the courses. The administrator can do housekeeping by deleting all the unwanted record in the student profile, lecturer profile and FSKTM courses.

1.3.2 Student section

This section consists of six modules, test module, quiz module, tutorial module, assignment module, view result module and change password module. For the test and quiz module, students are able to answer all types of questions that have been set on the web and view the result immediately after submitting all the answers. Students can obtain full information on tutorials and assignments and submit the assignments electronically from the assignment module and view the result of the assignments from

the view result module. Students are able to change their password through the change password module.

1.3.3 Lecturer section

This section consists of five modules. The modules are Databank module, Online Paper module, Marking Paper module, View Student Result module and Change Password module. In the databank module, lecturers are able to add, modify and remove test and quiz questions as well as posting the tutorial and assignments on the web. For the online paper module, lecturers are able to create test questions by selecting the questions from the databank module. Besides, in this section, the 'Objective', 'True and False' and 'Fill in the blank' questions will be automatically marked by the system through the marking paper module. The results of the students will be analysed and the lecturer can view the students' results through the view student result module. The change password module enables the lecturer to change their password.

1.4 PROJECT SCHEDULE

A Gantt chart is an easy way to schedule tasks. It is essentially a chart on which bars represent each task or activity. The length of each bar represents the relative length of the task. Figure 1.1 below is an example of Gantt chart where time is indicated on the horizontal dimension and description of activities makes up the vertical dimension. This is the project planning for the system.

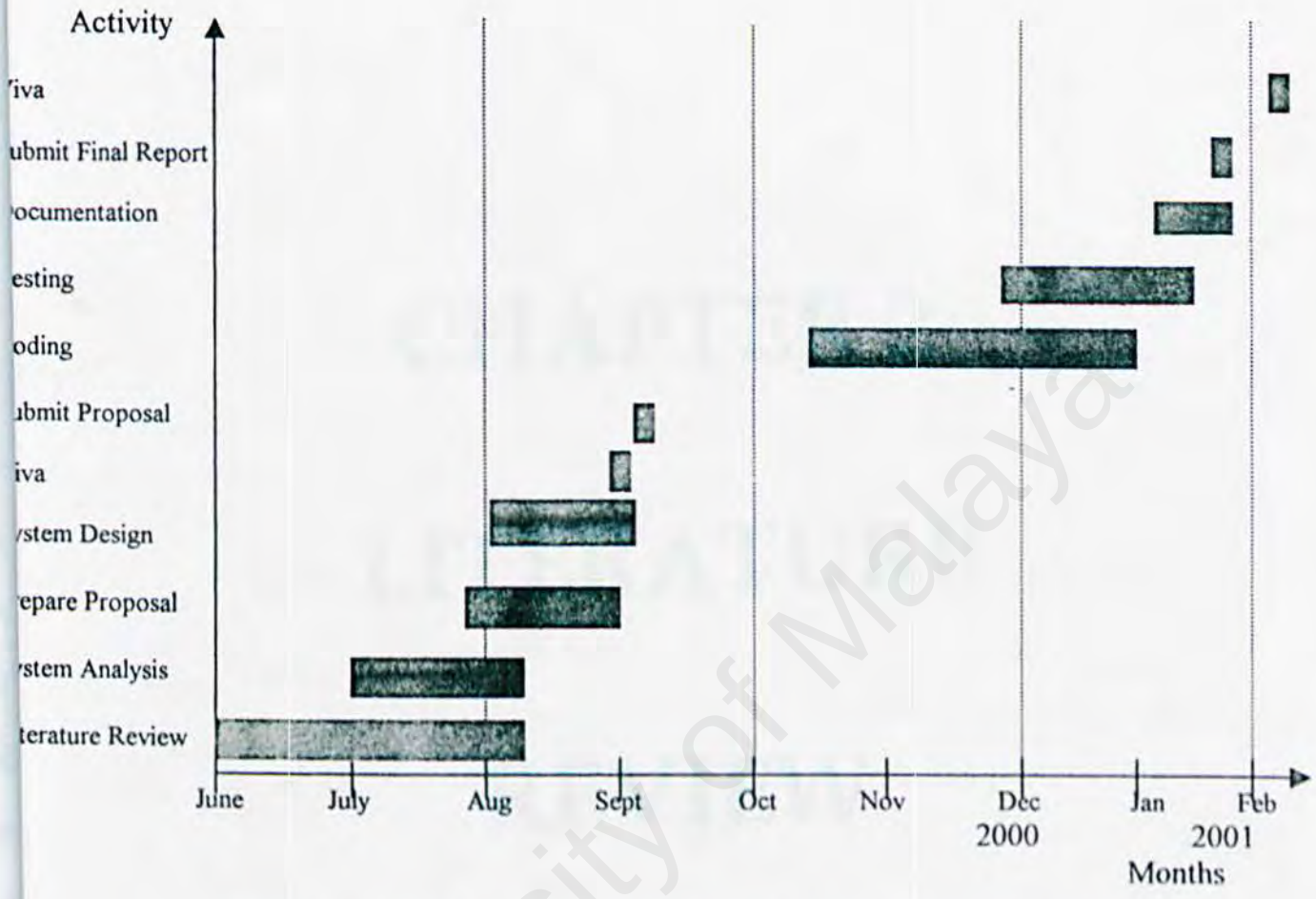

Figure 1.1: Using a two-dimensional Gantt chart for planning activities

CHAPTER 2 LITERATURE REVIEW

2.1 INTERNET

The Internet is the physical aspect like computers, networks and services. It allows us to connect to thousands of other computers across the world. The Internet began as a project in 1973 by the U.S. Defense Advanced Research Projects Agency (DARPA). The information superhighway or simply Internet is one of the most important developments in the history of information system. It is growing fast. The Internet is not one network, but tens of thousands of network linked together. In other word, it is a large network made up of thousands of smaller networks. Internet does not have overall central administration, because it is a collection of thousands of smaller networks. Internet provides four basic functions to its users:

- Telnet (Remote Login)
- E-mail
- Discussion Groups
- Information Resources

2.1.1 The World Wide Web

The World Wide Web is a global, seamless environment in which all information (text, images, audio, video, computational services) that is accessible from the Internet can be accessed in a consistent and simple way by using a standard set of naming and access conventions. The Web was initially conceived by Tim Berners-Lee and others at CERN. The scientists at CERN needed access to a wide variety of information on many different, distributed, computers. Bernes-Lee had this idea of universal readership, which is that any client should be able to read any information. Berners-Lee developed the basis ideas, which others have since added to. Then those involved agreed to work by a common set of principles such as there would be no central control, all web servers would use the same protocols/mechanisms such as http, http daemons, URLs and HyperText Markup Language HTML.

The phrase " World-Wide Web" is often used to refer to the collective network of servers speaking HTTP as well as the global body of information available using the protocol. A Web Client (or browser) sends requests to a Web Server. Every retrievable piece of information on the Web is identified by a URL, which includes the name of the object, where it is located and the protocol used to get it. Only information on a server (or your local system) is part of the Web. The Web server is responsible for document storage and retrieval. It sends the document requested (or an error message) back to the requesting client. The client interprets and presents the document. The client is responsible for document presentation. The language that Web clients and servers use to communicate with each other is called the Hypertext Transfer Protocol (HTTP). All Web

clients and servers must be able to speak HTTP in order to send and receive hypermedia documents. For this reason, Web servers are often called HTTP servers or HTTP Daemons (HTTPD).

2.1.2 Intranet

The term intranet has different interpretations. Most commonly, the term means a private, local or wide-area network (LAN or WAN) that uses TCP / IP, HTML and related browser technology on client computers and web server technology on servers. Less commonly, the term is used to mean any private LAN or WAN that involves client and servers.

Two characteristics of intranets differentiate them from the Internet. First, intranets are private. Either they are not connected to a public network via a firewall, is a computer that serves as a security gateway. Firewall computers monitor the source and destination of traffic between the intranets and Internet and filter it. Some firewalls operate so as to allow only certain traffic through; others operate so as to prohibit certain traffic; still others operate in both modes.

The second major differentiating characteristic of an intranet is speed. Most users connect to the Internet via a modem. Since today's modems operate in the range of 28.8 kbs (thousands of bits per second). On the other hand, the transmission speed of a local area network can be in the range of 1000,000 kbs. Hence, files downloaded on an local can be more than 10,000 times larger than those downloaded from Internet.

2.2 CLIENT/SERVER ARCHITECTURE

Many definitions of this architecture exist, ranging from an Access application with a shared database to an all-encompassing transaction processing system across multiple platforms and databases. Throughout all of the permutations and combinations, some major themes remain consistent:

- Requestor/Provider Relationship
- Message-Based
- Platform Independence
- Dynamic Routing

An architecture in which the client (personal computer or workstation) is the requesting machine and the server is the supplying machine, both of which are connected via a local area network (LAN) or wide area network (WAN). Since the early 1990s, client/server has been the buzzword for building applications on LANs in contrast to centralized minis and mainframes with dedicated terminals.

The client contains the user interface and may perform some or all of the application processing. Servers can be high-speed microcomputers, minicomputers or even mainframes. A database server maintains the databases and processes requests from the client to extract data from or update the database. An application server provides additional business processing for the clients.

The term client/server is sometimes used to contrast a peer-to-peer network, in which any client can also act as a server. In that case, client/server means nothing more than having a dedicated server.

However, client/server architecture means more than dedicated servers. Simply downloading files from or sharing programs and databases on a server is not true client/server either. True client/server implies that the application was originally designed to run on a network and that the network infrastructure provides the same quality of service as traditional mini and mainframe information systems

The network operating system (NOS) together with the database management system (DBMS) and transaction monitor (TP monitor) are responsible for integrity and security. Some of these products have gone through many client/server versions by now and have finally reached industrial strength.

2.2.1 Two-tier Client/Server

In the traditional two-tier client/server environment much of the processing is performed on the client workstation, using the memory space and processing power of the client to provide much of the functionality of the system. Field edits, local lookups, and access to peripheral devices (scanner, printer, and so on) are provided and managed by the client system .

In this two-tier architecture, the client has to be aware of the data resides and what the physical data looks like. The data may reside on one or more database servers, on amid-range machine, or on a mainframe. The formatting and displaying of the information is provided by the client application as well. The server(s) would routinely only provides access to the data. The ease and flexibility of these two-tier products to create new applications continue to be driving many smaller scale business applications.

2.2.2 Three-tier (multi-tier) Client/Server

The three-tier, later to be called multi-tier architecture grew out of this early experience with "distributed" applications. As the two-tier applications percolated from individual and departmental units to the enterprise, it was found that they do not scale very easily. And in our ever-changing business environment, scalability and maintainability of a system are primary concerns. Another factor that contributes to the more from two-tier to multi-tier systems is the wide variety of clients within a larger organization.

In multi-tier architecture, each of the major pieces of functionality is isolated. The presentation layer is independent of the business logic, which in turn, is separated from the data access layer. This model requires much more analysis and design on the front-end, but the dividends in reduced maintenance and greater flexibility pay off time and again.

2.3 OPERATING SYSTEM

2.3.1 Microsoft Windows NT Server 4.0

Since 1996, Windows NT Server 4.0 has been consistently improved, enhanced, and updated to meet those requirements. Today, Windows NT Server 4.0 has become the most comprehensive server operating system, yet at the core is a stable code base that has proven to be a strong and versatile performer for organizations of all sizes, earning broad industry support in the form of products and services. And now, as the vision for Windows 2000 Server has become clear and more widely understood, Windows NT Server 4.0's role as the most efficient path to the future of enterprise computing has similarly become more evident.

Microsoft Windows NT is one of the powerful operating systems for network computing. It combines the ease-of-use of Windows 95 with the power and reliability of Windows NT. Here are some of the advantages:

- It is productivity and compatibility as Windows NT ensures high performance for 32-bit programs. All Win16 Windows-based programs have the preemptive multitasking capabilities of Windows NT and can be run in a separate address space for better responsiveness and reliability.
- It meets the reliability standards to run critical line-of-business programs. It allocates separate memory space for 16-bits applications, so if one 16-bit

application fails it won't bring down other applications. It also protects critical operating system code, device drivers, and data from applications.

- It is ease-of-use interface that helps to work easier and faster.
- It is easy to manage and control as it includes remote management and troubleshooting tools and allows administrators to implement policies and standards for system-wide desktop configurations.
- It allows Object Linking and Embedding (OLE). In other words, it can combine information from several applications into one compound document using the special object linking and embedded capabilities of Windows-based application
- It has built-in tools for internetworking and intra-networking like TCP/IP, Microsoft Internet Explorer, and Microsoft Peer Web Services.
- It enables the capabilities of integrating applications on a single computer or even across multiple computers by using COM and DCOM

2.3.2 Microsoft Windows 2000 Server

Windows 2000 Server is a multipurpose, entry-level server operating system that can used to provide the network users with file, print, application, or Web services. Windows 2000 Server provides a well-integrated package containing the application development environment, security, and scalability. With Windows 2000 Server, user get all the usability features of Windows 2000 Professional, plus support for up to two multiprocessors for new installations and up to four multiprocessors when they upgrade from Windows NT 4.0.

As the server operating system built for the Business Internet Windows 2000

Server lets user:

- Use the Web to securely connect employees, customers, and suppliers—anywhere in the world.

- Share select information without compromising confidential data.
- Expand the network environment as the application needs evolve.
- Internet-enable business with essential technologies woven throughout the operating system.
- Cut costs with improved management systems for networks, servers, and Windows desktops.
- Sustain up-time with extensive reliability and availability improvements.
- Take advantage of new hardware with broad support for existing and emerging hardware and communication products.

Windows 2000 Server provides comprehensive, standards-based security services, including flexible authentication, data encryption, flexible and secure network access, protection of virtual private networks (VPNs) using core Internet standards such as IP Security (IPSec), secure transaction processing, and security extensions for the development platform such as the CryptoAPI.

Windows 2000 also introduces new technologies that let user build richer Web applications and solutions, such as the next generation of the Microsoft Component Object Model, COM+. Developers using COM+ find it much easer to create and use software components, and benefit from a runtime environment and services that are easily used from any programming language or tool.

Another technology revolutionizing the Internet is the Extensible Markup Language (XML). XML enables easy integration of data from multiple sources, reduced network traffic, granular updates, and more meaningful searches. The Windows 2000 XML Parser is implemented as a COM component, providing a complete XML foundation for Windows DNA-based applications.

In addition, Windows 2000 includes integrated support for streaming media, which allows organizations to develop and distribute real-time presentations and rich multimedia content to both internal and external audiences. Imagine being able to send full screen video to your users' desktops on demand, while providing CD-quality audio, digital rights management, and great integration with other application software.

2.3.3 Window NT Server 4.0 versus Window 2000 Server

Window 2000 Server is newer than Window NT Server 4.0, surely it will has more advantages than Window NT. Below are some of the differences:

- Windows 2000 was twice as fast as Windows NT 4.0
- Active Directory's long and wide reach is what makes Windows 2000 both compelling and formidable. The Active Directory security model integrates with everything in the enterprise, the management components will touch every desktop, and its authorization model affects every user. In addition, other enterprise directories can be integrated into Active Directory.
- In Window 2000, trust relationships are developed within domains.
- Able to easily delegate authority to change user accounts spread across several Windows 2000 OUs (Organizational Units)

- Windows 2000 provides the technologies required to let the Internet applications grow without limitations. It allows the most demanding high-end applications to use more computer memory. For example, Active Server Pages scales two to three times better on multiple processors than Windows NT 4.0 does.
- Windows NT Server provides many of the same services found in Windows 2000 Server, however it lacks an extensible, hierarchical directory. Although the directory in Windows NT Server 4.0 provides organizations with a centralized directory for managing users and groups and single logon services, it is less comprehensive than the feature-set in either Active Directory or Novell Directory Services (NDS).

2.4 WEB APPLICATION PROGRAMMING TECHNOLOGY

2.4.1 Active Server Pages (ASP)

Microsoft Active Server Pages (ASP) is a server-side scripting environment that developer can use to create and run dynamic, interactive Web server applications. With ASP, developer can combine HTML pages, script commands, and ActiveX components to create interactive Web pages or powerful Web-based applications. ASP applications are easy to develop and modify.

ASP is a server-side scripting platform supported by Microsoft Internet Information Server (IIS), Microsoft Personal Web Server (PWS), and by other Web servers via

ChiliASP. It provides the same functionality as CGI scripts and is especially useful for integrating data from Windows-based databases (e.g., Microsoft Access and SQL Server) and other ODBC (Open Database Connectivity) compliant databases with client site. ASP is not an application. It is a VBScript interpreter that is integrated with IIS, together with an interface for other custom component. It is also able to include other web pages component like Active X controls and Java Applets. Therefore, ASP is considered as a glue technology, which binds together other various server-based systems to help build interactive web pages.

The advantages of ASP are as below:

- It is suitable for publishing and collecting data on web
- It provides a way for building secure transactions, server-based applications and web-sites
- It provides Active Database Object, one of the Active Server Components allows easy but powerful connections to be made to almost any database system for which an Open Database Connectivity (ODBC) driver is available
- It has pre-build Active Server Components which provide plug-in objects that will perform specific tasks
- It supports clients-server programming. Furthermore, the combination of ASP, client-side scripting and objects can be used to create client/server applications
- It is able to create clients side code dynamically on the server.
- In the ASP pages developer can use any scripting language for which they have installed a scripting engine that follows the ActiveX Scripting standard. ASP

comes with scripting engines for Microsoft Visual Basic Scripting Edition (VBScript) and Microsoft JScript™ so that developer can immediately begin writing scripts. ActiveX Scripting engines for PERL, REXX, and Python are available through third-party developers.

Because developer scripts run on the server rather than on the client, developer Web server does all the work involved in generating the Web pages that have been send to browsers. Developer need not worry whether a browser can process his scripts: the Web server does all the script processing, transmitting standard HTML to the browser. Server-side scripts cannot be readily copied because only the result of the script is returned to the browser. Users cannot view the script commands that created the page they are viewing.

2.4.2 ASP compare to CGI applications

ASP provides all of the functionality of CGI applications in an easier-to-use and more robust environment. ASP is an easier way for server to access information in a form not readable by the client (such as an SQL database) and then act as a gateway between the two to produce information that the client can view and use.

With CGI, the server creates as many processes as the number of client requests received. The more concurrent requests there are, the more concurrent processes created by the server. However, creating a process for every request is time consuming and requires large amount of server RAM. In addition, this can restrict the resources available for sharing from the server application itself; slowing down performance, and increasing wait times on the Web. ASP instead runs in the same process as the Web server, more handling client requests faster and more efficiently. It is mush easier to develop dynamic content and Web application with ASP.

2.4.3 ASP compare to ISAPI applications

ISAPI applications require all of the programming and layout to be contained in a dll file written in C++. ISAPI applications are thus more difficult to create and maintain. With ASP files, and HTML writer can script an external component and format the output. ASP separates the layout and design from the business logic.

2.4.4 ASP compare to PERL

PERL is the most popular programming language for writing CGI scripts. Due to its popularity, power, and flexibility, as well as the fact that scripts written in PERL can run easily on most Web servers, PERL is the language that we teach for CGI scripting. Anyway, PERL and other scripting languages are not robust development tools by themselves. ASP provides a familiar framework and objects for building complex applications that require data from relational databases and legacy sources. ASP supports virtually any scripting language to build these applications. Third parties are currently developing additional scripting engines, such as PERL, which will be announced when they are ready.

2.5 WEB APPLICATION DEVELOPMENT TOOL

2.5.1 Microsoft Visual InterDev

Microsoft Visual InterDev, the newest member of the visual tool family, is an integrated development tool for building dynamic web applications accessible by any web browser on any platform. It includes an integrated development environment, database connectivity tools, programmable components, site management and publishing capabilities, a personal Web server, content creation tools and more.

Microsoft's Visual InterDev 6.0 raises the standard for Internet and intranet applications to a new level. This product includes many new features—such as buttons and other innovations in the interface—but its Scripting Object Model sets it apart from other development tools.

Visual InterDev also includes a variety of development features for integrating client-server and Web technologies. These features are enabled through Visual InterDev's support for ActiveX; seamless database connectivity to any ODBC data source, support for building and testing large systems, and comprehensive support for the development of web application.

Visual InterDev provides a rapid, visual development environment for building ASP. Visual InterDev also can easily integrate ActiveX server components written in Visual J++, Visual Basic, Visual FoxPro, and Visual C++. Using Visual InterDev with ActiveX server components, a developer can easily create multi-tier web applications. ActiveX server components provide a convenient and effective way to tightly integrate a web application with existing Internet systems.

Visual InterDev delivers a comprehensive set of tightly integrated database tools for web developers. The database connectivity features are based on the industry. Standard ODBC, including Oracle, Microsoft SQL server, Microsoft Access, Microsoft Visual FoxPro, Informix, Sybase, IBM DB/2 and way other. In addition, using Visual InterDev, a developer can create scalable database solutions because it leverages ASP. The core database components of Visual InterDev include Active Data Object (ADO), Integrated Data view, design-time ActiveX Controls, Database Wizards, Query Designer, Database Design.

A Visual InterDev project consists of a live web site when developers open a "project" they are actually opening a live view of a sites as it exists on the web server. The IDE is thus a complete web site management tool that allows the developer to easily modify the

structure of a web site and to edit, add, move, rename and delete files and folders on the web site. Multiple web sites (projects) can be open at the same time.

2.5.2 Lotus Notes

Lotus Notes is the only groupware solution today that combines four essential technologies:

- E-mail messaging and scheduling
- A powerful, distributed document database
- An open platform system environment
- A rich application development environment

It is the only software product that addresses a comprehensive definition of what groups of office workers have to accomplish and how computers can facilitate those activities. Lotus Notes addresses all of these aspects of group activity such as e-mail programs, bulletin board, discussion software, form routing products, etc.

It has document databases and messaging capability as described before. In addition to that, Notes provides a rich programming environment that offers developers a selection of programming languages, from simple (the Notes @function language) to more powerful and complex. (LotusScript, an ANSI BASIC compliant language similar to Visual Basic; the Lotus Notes API, a library of C functions; HiTest Tools for Visual Basic; HiTest Tools for C++; numerous third-party programming tools; and, due to be available in Notes Release 4.5, an implementation of Java).

Benefits of Notes

- Replicas and Replication: Notes lets you keep multiple copies of a single database, called replicas, on multiple servers or workstations. This lets users on a

variety of networks in a variety of locations access the same information. Replication is the process of exchanging modifications between replicas. Through replication, Notes makes all of the replicas essentially identical over time.

- Notes is very customizable. Every application can be customized in less time that it would take with most other applications.
- Work flow: Notes allows user to set up applications to make it easier to route the form to the appropriate person.
- Document sharing: Notes makes it easy for several people to work on a document, review it and make comments.
- Rich Text Documents: Any Notes Document, including email, can have graphics, video and sound along with regular text.
- Web Publishing: Almost all the benefits of Notes are now available from the Web. Notes databases are automatically converted to HTML, in real time making it possible for user to browse or edit information in the databases.

2.6 WEB APPLICATION PROGRAMMING LANGUAGE

2.6.1 Hyper Text markup Language (HTML)

HTML is the lingua franca for publishing hypertext on the World Wide Web. It is a non-proprietary format based upon SGML, and can be created and processed by a wide range of tools, from simple plain text editors - user type it in from scratch- to sophisticated WYSIWYG authoring tools.

To develop the next generation of HTML as a suite of XML tag sets with a clean migration path from HTML 4.0. Some of the expected benefits include: reduced authoring costs, an improved match to database & workflow applications, a modular solution to the increasingly disparate capabilities of browsers, and the ability to cleanly integrate HTML with other XML applications.

To publish information for global distribution, one needs a universally understood language, a kind of publishing mother tongue that all computers may potentially understand. The publishing language used by the World Wide Web is HTML (HyperText Markup Language).

HTML gives author the means to:

- Publish online documents with heading, text, tables, lists, photo, etc.
- Retrieve online information via hypertext links, at the click of a button
- Design form for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
- Include spreadsheets, video clips, sound clips, and other application directly in their document.

Most people agree that HTML documents should work well across different browsers and platforms. Achieving interoperability lowers costs to content providers since they must develop only one version of a document. If the effort is not made, there is much greater

risk that the Web will devolve into a proprietary world of incompatible formats, ultimately reducing the Web's commercial potential for all participants.

HTML has been developed with the vision that all manner devices should be able to use information on the Web. PCs with graphics displays of varying resolution and color depths, cellular telephones, hand held devices, devices for speech for output and input, computers with high or low bandwidth, and so on.

2.6.2 Visual Basic Scripting

Microsoft Visual Basic Scripting Edition (VBScript) is a subset of the Microsoft Visual Basic language. It is implemented as a fast, portable, lightweight interpreter for use in World Wide Web browsers and other applications that use Microsoft ActiveX controls, Automation servers, and Java applets. VBScript is currently available as a part of Microsoft Internet Explorer and Microsoft Internet Information Server.

VBScript code, like JavaScript, does not produce standalone applets but is used to add intelligence and interactivity to HTML documents. For programmers who already know Microsoft Visual Basic, VBScript is a valuable alternative to JavaScript in activating web pages .

There are three separate classes of objects available within VBScript:

- Objects provided by the VBScript engine

- Objects provided by Internet Explorer
- Objects provided by the Web page author

The primary motivation for using VBScript in the Students' Coursework Evaluation System is as an alternative to JavaScript and Java. If, for instance, an application for the Students' Coursework Evaluation System requires the use of a scripting language, VBScript can be used if the application is written to support Microsoft ActiveX Scripting, since doing so will allow it to host VBScript. An important bonus to this is because ActiveX Scripting is an open standard, the application can also host any other language that is written to that standard.

2.7 WEB DATABASE

2.7.1 Microsoft SQL Server 7.0

Structured Query Language (also known as SQL) allows users to access data in relational database management systems, such as Oracle, Sybase, Informix, Microsoft SQL Server, Access, and others, by allowing users to describe the data the user wishes to see. SQL also allows users to define the data in a database, and manipulate that data.

It provides the most robust Relational Database Management System for organizations using the Microsoft Windows NT Server/Windows 2000 Server platform. And it does it while leveraging your current technology investment, making it far more cost-efficient than other systems that rely on proprietary technologies.

SQL Server 7.0 is the easiest database to use for building, managing, and deploying business applications that deliver solutions to business problems. It provides a fast and simple programming model for developers, eliminates database administration for standard operations, and provides sophisticated tools for more complex operations. SQL Server 7.0 also lowers the total cost of ownership through simplified management, automation of routine tasks, event-based job execution and alerting, integrated security, and administrative scripting.

SQL Server 7.0 is the heart of Microsoft's strategy of making data warehouses and data marts easier to design, build, and manage. It gives organizations tools for gathering data from all enterprise sources, building a powerful query environment for using the data, and distributing this business intelligence across the enterprise – even to mobile users.

2.7.2 Microsoft Access 2000

Microsoft Office provides a broad array of tools and technologies for creating multi-user database solutions. Specifically, Microsoft Access provides tools and features for creating multi-user database solutions by using four different database architectures: file-server, client/server, replication, and Web-based data access pages.

In Access 2000

- Developer can create three types of Web pages: data access pages, server-generated HTML files (ASP and IDC/HTX) and static HTML files. This article discusses the features and advantages of each.
- Developer can use a grouped data access page to filter and view only the information they want to see.

- User can find some ways to find information in Access 2000 Help and introduces us to other technical resources.
- Developer can use conditional formatting to make a control on a form or report look different from record to record, depending on the control's value, the value of an expression or whether we're currently in that control.
- Developer can use keyboard to create and delete relationships and to define default join types.
- User can manage the relationships between tables by using the keyboard. They can create a database and import tables, define a relationship between tables, create a query and use a cascading delete.
- Developer can send database objects through e-mail as attachments. They can also send data access pages as the body of an e-mail message. Pages have important database and security considerations.
- Developer can sort records in a project before or after they are retrieved from the database. The method of sorting we use can affect performance. The location of the database can also affect the results of the sort.
- Developer can use an expression to combine two or more text strings into a single test string. They can also use string manipulation functions in an expression to separate a single text string into two or more text strings.
- Developer can organize different types of database objects into a group. Adding a database object to a group doesn't actually change the object's location in the database, it creates a shortcut to the object in the group.

2.8 DATABASE CONNECTIVITY

2.8.1 Remote Data Object (RDO)

RDO is specifically designed to deal with remote intelligent data sources. It provides a high granularity of control over remote data sources so that the need to resort to the

exposed Open Database Connectivity (ODBC) interface handle is not required. RDO also include the ability to create local cursors as well as dissociate result sets and connections.

RDO is also fully asynchronous and event-driven. With RDO, the developer need not to wait for operation completion as an event is fired whether or not the operation succeeds. This technology allows for leveraging the ability of Windows 2000 or Windows NT to run multiple threads of execution. RDO is also thread-safe so it is suitable for use in multiple-threaded headless components executed on a remote server. RDO also suitable when working with SQL Server, Oracle or any relational database that is exposed within ODBC driver regardless of its ODBC compliance level.

2.8.2 Advance Data Object (ADO)

ADO is a technology that can be used by Web page developers to add database access to their online content. Database access open up a world of information that can be used to customize Web site offerings based on user preferences, past usage history, or up-to-the-minute news. Database applications, with ADO, can be written as online applications, accessed anywhere over the global Internet.

ADO is technology meant for application and Web-site developers with modest programming skills. It's capable of condensing otherwise complex and lengthy programming tasks into simple-to-use statements and strong enough to grow as the

demand for more advanced features. ADO makes both common and advanced operations simpler to use than ever before.

Online applications can be built by using ADO on the server to deliver customized content through the World Wide Web. In this way, any platform supporting a modern Web browser can automatically take advantage of data access. Users of Windows PCs, Macs, UNIX Workstation, or other types of consumer Web devices can easily tap into particular online application to make inquiries and order products.

2.9 A SURVEY ON EXISTING COURSEWORK SYSTEM

Surveys on the existing coursework system available in the software market and on the web have been carried out and the information gathered are summarized below.

2.9.1 ExamWeb

ExamWeb was created originally to help one of its founders study for an exam. Cofounder Matt Harris wanted a way to study at home that was more effective than reading books, taking paper-based practice exams, listening to audio tapes and gazing at the VCR. Since then ExamWeb keep their focus of delivering effective test preparation courses using the complexity and power of the internet. ExamWeb designed proprietary exam "engines" and tracking tools that allows them to load their courses with features which translate into effectiveness. The same engine can be used to developed customized corporate training programs or continuing education courses. The market is for anyone

on the planet who wants or need to learn a new subject, acquire a new certification or pass any one of the World's thousand of exams.

After more than 23 years of providing CPA review classes, Mark Dauberman of Mark's CPA review has found that their primary job is to help student stay motivated so that student will put it in the study time necessary to pass. As a result, they have designed their program to do that by:

- Providing comprehensive, exam-focused course materials
- Assembling the country's finest CPA review course instructors to write the course
- Making available a multitude of study tools to aid in the efficiency of your studies

Their course materials are designed to provide student with all of the information that student need to pass the exam. They have developed these materials in such a manner that they are easy to read, easy to understand and focused exclusively on those items necessary to help student pass the exam. While their materials are very comprehensive, they do not cover items that are clearly unlikely to appear on the exam.

CHAPTER 3 SYSTEM ANALYSIS

3.1 INTRODUCTION

System Analysis is the most important phase in a software development life cycle. It is the process of defining a problem, gathering pertinent information, developing alternative solutions and choosing among those solutions. This phase involves all the activities necessary to determine and gain the requirements of the system.

3.1.1 Project Development Strategy

The project development strategy is a description of the way which this project is done in actuality. The development strategy for this project is based on the software prototyping model. Prototyping development is an idea of developing an initial implementation, expose it to the user for comment and refining it through many versions until an adequate system has been developed. Rather than having separate specifications, development and validation activities, these are carried out concurrently with rapid feedback across these activities. This is based on the six steps which show in Figure 3.1

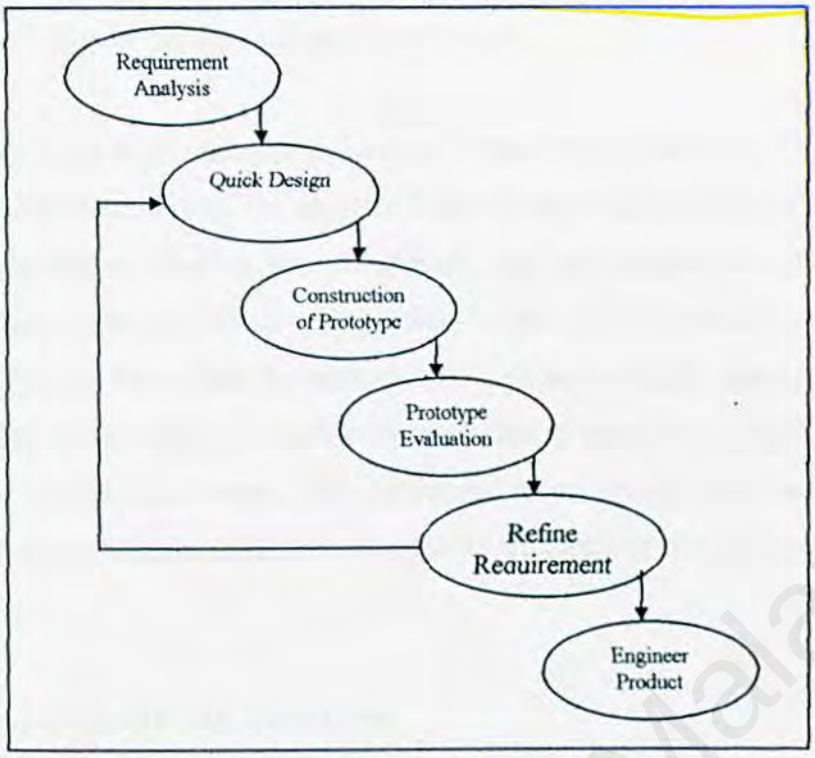

Figure 3.1 Software Prototyping Model

The description of each step are shown as below:

(a) Requirement Analysis

To carry out research and analysis, and to develop an abbreviated representation of the requirements.

(b) Quick Design

Quick design on software system functions which may be enhanced in later phase.

(c) Construction of Prototype

Prototype software is created, tested and redefined.

(d) Prototype Evaluation

The tested version of the prototype is presented to the user to test and suggest modifications.

(e) Refine Requirement

Justify requirements or add in new requirements.

(f) Engineer Product

Activity (b) to (e) are repeated until all requirements are formalized or until the prototype has evolved into a production system.

System prototyping is an interactive process. It may begin with only a few functions and expand to include others that are identified later. It may also start with what both analyst and user believe is a complete set of functions that may expand or contract through use and experience. There are actually many ways to develop a system. A prototype model is selected to develop the system because it can be created quickly, often within a matter of days or weeks. And usually, it is also relatively inexpensive to build, compared with the cost of a conventional system. The emphasis is on trying out ideas and providing assumptions about requirements, not on system efficiency or completeness.

3.2 ANALYSIS OF THE SYSTEM

There are a variety of technique can be used to determine the requirements of the system / users. This includes sampling and investigating hard data, interviewing, using questionnaires, prototyping and observing decision-maker behavior and the office environment. However, not all the technique can be used at the same time, it depend on situation. Among the information-gathering techniques that I used are questionnaires, observations and analysis of some existing system.

Interview with the students and lecturers have been carried out. This is the most important step in developing the Students' Coursework Evaluation System because the feedback from lecturers and students can help to obtain the basic requirements of the system. Hence, the system will fulfill the needs of the end users.

As mentioned in chapter 2, some studies on the existing coursework system on the web have been carried out to get an overview of the system to be built.

Studies on other existing coursework system can basically give some ideas on the usual information displayed on the web and the features used in the applications. Different coursework system will require different features and functions.

At the end of the analysis, a complete system can be built based on the ideas and information obtained from the analysis.

3.3 DEVELOPMENT TOOLS ANALYSIS

Since this system development focus on students' coursework and evaluation system, an analysis on the related development tools for the system has been carried out. After reviewing and analyzing the requirements, the tools for developing the system have been decided. These tools include the operating system, databases, development software and programming languages.

3.3.1 Operating System

3.3.1.1 Windows 98

Windows 98 Server provides an integrated, comprehensive and easy-to-use solution. Windows 98 has been designed from the ground up as an integrated multipurpose operating system. As opposed to combining un-integrated services, Windows 98 Server

provides complete integration between its services resulting in easier management and lower TCO. For instance, once authenticated to the directory, users don't need to re-authenticate themselves to access other applications and services.

Windows 98 is used as the main server operating system. The main reason using Windows 98 is its user friendliness and stability features. Besides, Windows 98 offers many benefits over other operating systems. By making use of these benefits, developer can be more productive and publish content on the internet by exploiting various capabilities of Windows 98.

3.3.2 Web Client

3.3.2.1 Microsoft Internet Explorer 4.0

Microsoft Internet Explorer 4.0 or above is selected as the only browser been used in SCES. It supports most of the scripts, and most importantly, could support the ActiveX controls that are also used in the project. Netscape Communicator is not under SCES's consideration because it cannot interpret VBScript which is the main scripting language used in SCES.

3.3.3 Programming Technologies and Language

3.3.3.1 Active Server Pages

Active Server Pages is the script that runs in the Microsoft Web server. Its function is to generate HTML scripts for the client browser. ASP is easier to be used and is more flexible in changing codes as no compilation is involved. It is, therefore, selected as the main development tools for the server run script.

With ASP and scripting languages skills, programmer can create increasingly complex scripts. Besides that, programmer can easily use ActiveX components to perform complex tasks, such as connecting to a database to store and retrieve information.

3.3.3.2 Hypertext Markup Language (HTML)

In order to develop a web-based application, the HTML script is needed. HTML is the basic tool that is necessary for the development of client's browser run script. This is because the HTML documents work well across different browsers and platforms.

3.3.3.3 VBScript

Besides HTML, VBScript is another selected tool for the development of client's browser run script. Its function is to make the web application more dynamic. Although VBScript

is still new if compared to the JavaScript, however, proved more reliable in working with the ASP. When used in Microsoft Internet Explorer, VBScript is directly comparable to Microsoft JavaScript (not Java). Like JavaScript, VBScript is a pure interpreter that processes source code embedded directly in the HTML.

3.3.4 Web Application Development Tool

3.3.4.1 Notepad and Microsoft Visual InterDev

Notepad and Microsoft Visual InterDev becomes the editor for the ASP coding. The use of Notepad as an editor is not as good as the Microsoft Visual InterDev, which provides more features that are helpful for ASP coding. Notepad, however, is available in most on the Windows workstation.

Lotus Note is not used as web application development tool due to unfamiliarity with Lotus environment and the long learning curve required.

3.3.5 Web Database

3.3.5.1 Microsoft Access 2000 Database

Students' Coursework Evaluation System database will be developed using Microsoft Access 2000. This is because it can handle large amount of data storage capacity that is suitable to be use in faculty of Computer Science and Information Technology. Since Access 2000 can support SQL Server 6.5 and 7.0 and incorporate the VBA environment, it will be best chosen for the main database repository. Besides that, it also can integrate with the web. Furthermore, it is one of the Office members and the operating system which has been chosen, the Windows 98 and both of them can support each other.

3.3.6 Database Connectivity

3.3.6.1 Advances Data Object

Database connectivity used in SCES is Advances Data Object (ADO). ASP use ADO to access the database. ADO provides critical features that are needed to transform existing client-server application into Web-enabled applications. The ADO object supports various cursor types, batch updating, extended record set management techniques, and advanced stored procedure support.

3.4 REQUIREMENT ANALYSIS

A requirement is a feature of the system or a description of what the system is going to focus in order to achieve the goals of the system. Requirements are divided into two categories: functional and nonfunctional requirements. The purposes to determine the requirements for the software-based system are:

- Enables the system engineer to specify software elements, and establishes design constraints that the software must meet.
- A complete understanding of software requirements is essential to the success of a software development effort.
- To tell the designers what functionality and characteristics the resultant system is to have.

3.4.1 Functional Requirements

Requirements analysis covers the area of functional and non-functional requirements of the Students' Coursework Evaluation System. The functional requirements probably can be divided into three sections, which are General Section, Student Section and Lecturer Section. Each of the section will have its own module that performs different function and task.

3.4.1.1 General Section

- Change Password Module

This module allows the administrator to change password for security purpose. An authentication and authorization process is vital to SCES to ensure that only the authorized user is able to access into the system. The administrator has to key in the old password to ensure that a valid user is making changes. If an old password is keyed in wrongly more than three times, the system will automatically abort the changes of password procedure. This is to protect the system from unauthorized access.

- Student Profile Module

In this module, the administrator will create the student account for using Students' Coursework Evaluation System. All students will be given Matric number and Password. Information such as Name, Matrix number, Majoring, Gender and E-mail address are required. All the students particular will be stored in the database. The administrator is able to add, edit and delete the student information through this module.

- Lecturer Profile Module

In this module, the administrator will create the lecturer account for using SCES. All lecturers will be given Username and Password. Information such as Name and E-mail address are required. All the particular of the lecturer will be stored in the

database. The administrator is able to add, edit and delete lecturer information through this module.

- FSKTM Courses Module

The administrator is able to add or edit the courses available in FSKTM through this module. Course code and course name are needed in order to store the data into the database. A lecturer is assigned to a certain course. Deleting a course will delete the lecturer taking that particular course.

3.4.1.2 Student Section

- Quiz and Test Module

Through this module, the students are able to answer all types of online test questions that have been set by the lecturers. For the 'Objective' and 'True and False' questions, students only required to select the option provided in order to answers the questions. For Fill-in-the-blank, Structure and Essay questions, students are required to type in their answer into the Text Box that has been designed. They are able to switch among the questions to answer base on their priority as long as they haven't submit their answers. All the students will be required to submit their answer through the system only at end of the test. After the students have submitted their answer, the system will automatically log them out from the system and they are disable to login again.

- Tutorial and Assignment Module

Students are able to obtain full information on tutorials and assignments on the web. Besides that, students are able to submit their tutorial and assignments electronically through this system. Students are required to submit their tutorial and assignment by answering the questions in the text box provided. For those students who already submitted their tutorial or assignments, they are not allowed to resubmit their tutorial or assignments again.

- View Result Module

In this module, students are able to view the result of the test immediately after they have submitted their answers. This is normally for the 'objective', 'True and False' and 'Fill in the blank' questions. For the tutorial and assignments, students can only view the result of their assignments after the lecturer has finish marking it.

- Change password Module

This module allows the student to change password for security purpose. An authentication and authorization process is vital to SCES to ensure that only the authorized user is able to access into the system. The student has to key in the old password to ensure that a valid user is making changes.

3.4.1.3 Lecturer Section

- Databank Module

Through this module, lecturers will be able to store their entire questions into the database for future selection. They are able to store all types of questions, which are Objective, True and False, Fill-in-the-blank, Structure and Essay. The answer for Objectives, True and False as well as Fill-in-the-blank questions will be stored into the database too. In this module, lecturers are able to add, edit and delete test and quiz questions as well the tutorial and assignment questions.

- Online Paper Module

In the online paper module, lecturers are able to create the test or quiz questions. All the test or quiz questions will be selected from the Data Bank module. Through this module, the lecturers are able to add, edit or delete the questions in order to create the test and quiz paper. Lecturers are required to enter the information such as test or quiz date, time and duration of the test or quiz in order to create a quiz or test paper. Besides test and quiz, the tutorial and assignment questions are also created by selecting the questions provided in the databank module.

- Marking paper Module

Through this module, the 'Objective' questions, 'True and False' and 'Fill-in-the-blank' questions will automatically be marked by the system. Whereas, the assignments and tutorial questions with the answers will be displayed and the lecturers are required to enter the score through a special designed score entry

interface. The score of the student will be stored in the database and the system will automatically total up the score if required.

- View Student Result Module

The result for the test and assignments of the student will be analysed by the system. After the lecturers have finish marking the assignments, they are able to view the result of the student through this module. With this module, lecturers will be able to do the evaluation on students' performance.

- Change Password Module

The lecturers are able to change their password through this module for the security purposes.

3.5 NON-FUNCTIONAL REQUIREMENTS

A non-functional or constraint describes a restriction the system that limits our choices for constructing a solution to the problem. These requirements are very subjective but are as important as the functional requirements.

3.5.1 Inter-operability

Applications and computers from different suppliers will have the capability to work together on a network and to connect to each other, share data and processes as appropriate.

3.5.2 Reliability

A system is said to have reliability if it does not produce dangerous or costly failures when it is used in a reasonable manner, that is, in a manner that a typical user expects is normal. This definition recognizes that a system may not always be used in the ways that the designer expects.

3.5.3 Accuracy

Accuracy refers to the precision of computations and control. SCES provides various accuracy measures. For instance, sign up page is able to eliminate duplicate records such as User name and password, therefore always maintaining an accurate database.

3.5.4 Maintainability and Expandability

Maintainability may be defined quantitatively as the ease with which software can be understood, corrected, adapted and enhanced. Maintainability is the degree to which architectural data or procedural design can be extended. SCES is design to be expandable in the future.

3.5.5 Security

The security features built in prevents unauthorized access into the full-text of the SCES, user must log in with correct user name and password in order to access the full text of the SCES. Authorized user can change their password desired.

3.6 RUN-TIME REQUIREMENT

3.6.1 Server Hardware Requirements

The server computer requirements are:

- A server with at least Pentium 166 MHz processor
- At least 32 MB RAM
- Network Interface Card (NIC) and network connection with recommended bandwidth at 10Mbps or more
- Others standard computer peripherals

3.6.2 Server Software Requirements

To host and run the system, the server computer needs to have supporting software installed:

- Windows 98
- Microsoft Internet Explorer 4.0
- Active Server pages
- Microsoft Access 2000

CHAPTER 4 SYSTEM DESIGN

4.1 INTRODUCTION

System design is a critical part for the whole project. So, good design is the key to successful software project. This is the stage in the system development process where the requirements for the system are translated into the system characteristics. There are many stages in the design process as follow:

The stages in the design process are:

- Architectural Design

The sub-system making up the system and their relationships is identified and documented. In this model, users interact through the use of server-side programs that provide for an enhanced experience.

- Database Design

The data structures used in the system implementation are designed in detail and specified. In a relational database, a table or relation is a collection of unique instances of similar data.

- User Interface Design

Services are allocated to different components of the system and the interfaces of these components are designed. This enable user interacts with the system.

- Process Design

Structured design is a process oriented for breaking up a large program into hierarchy chart of modules that result in a computer program, which is easier to implement and maintain.

4.2 ARCHITECTURE DESIGN

Overview of the Students' Coursework Evaluation System Architecture

It is a web-based application as shown in Figure 4.1

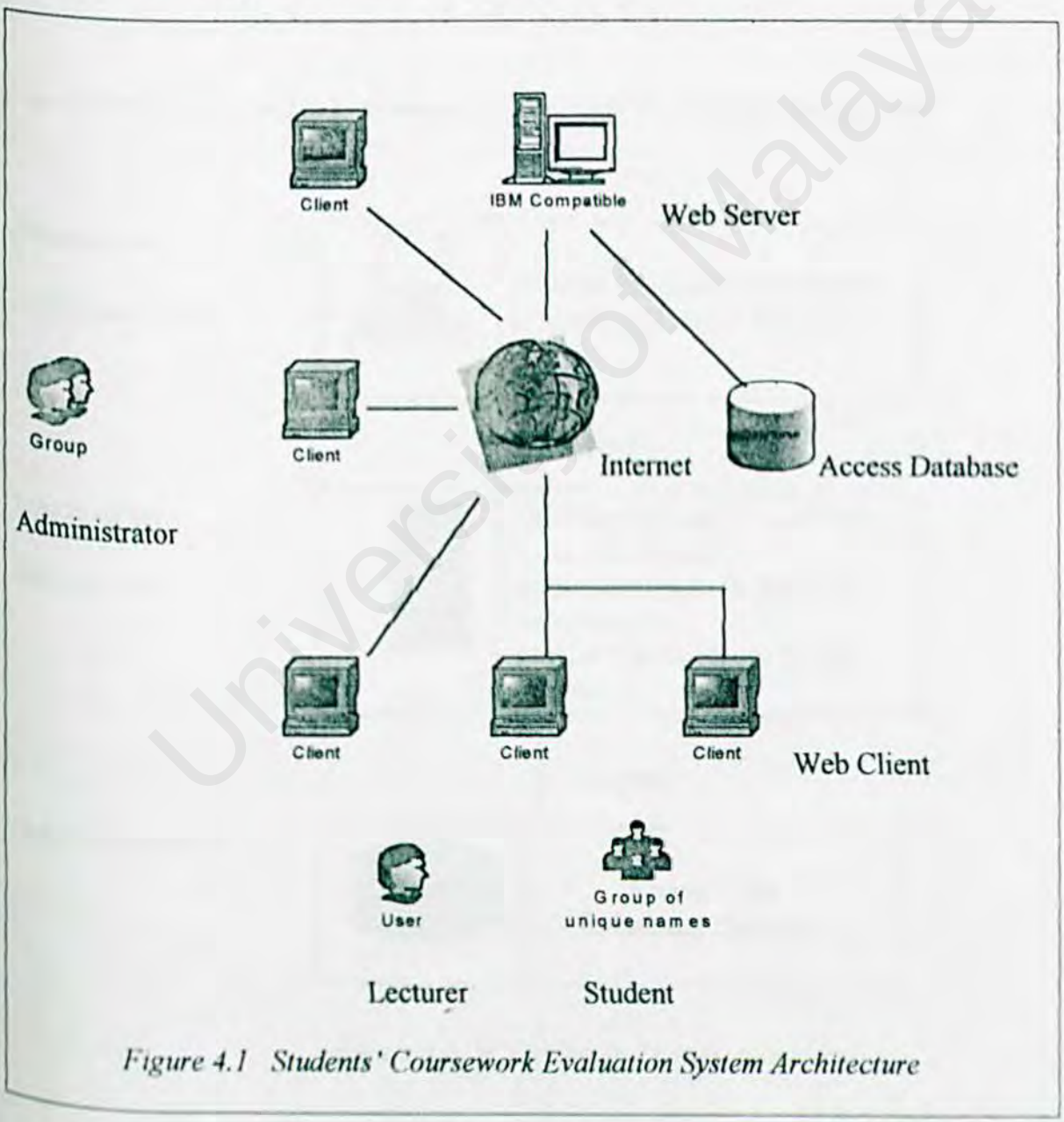

Figure 4.1 Students' Coursework Evaluation System Architecture

In the overall system design, the Students' Coursework Evaluation System is designed to be 3 tiers architecture, which is believed to be more loosely coupled design for the components used. In the SCES design, the frontier is the presentation / application tier which is an Internet browse and is used to present the human interactive interface to the user. The middle ties is known as the functionality / service tier. The communication between this tier and the front tier depends on the Hypertext Transfer Protocol (HTTP) for the web pages transfer.

The tier shown in figure 4.2 is data repository, which is for database management.

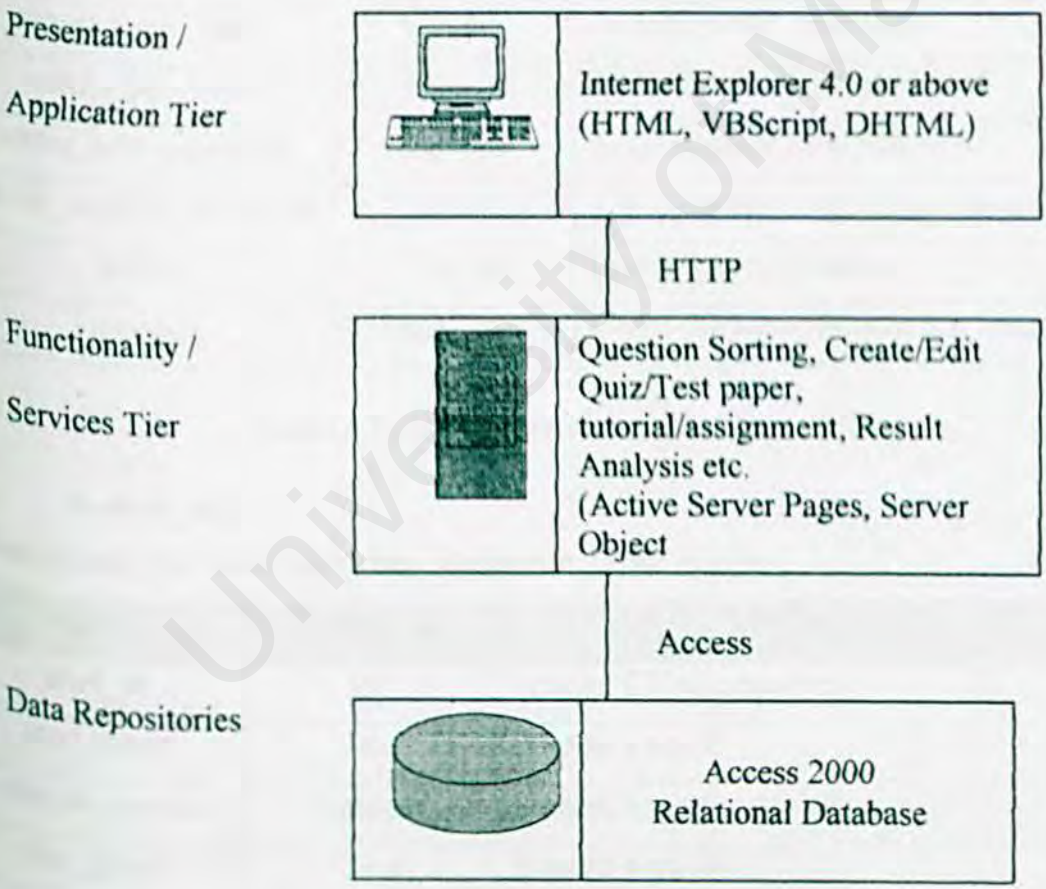

Figure 4.2 SCES Tier to Tier Architecture

4.3 DATABASE DESIGN (DATA DICTIONARY)

The Students' Coursework Evaluation System uses the relational database model in its database implementation. The database is developed using Microsoft Access 2000. The database consists of 39 tables. All the attributes of the database tables are listed as follow. The primary key of the table is represented by **bold** text (e.g. **admin_id**)

1. administrator_info

Description: This table stores the information of the administrator

Fields Name	Data Type	Description
admin_id	Int	Administrator ID (auto number)
admin_login_name	Varchar	Administrator login name
admin_password	Varchar	Administrator login password
admin_new_password	Varchar	Administrator New password
admin_confirm_password	Varchar	Administrator confirm new password
Active	Yes/No	Check the login status
LastLogin	Date/Time	Check the administrator last login time

Table 4.1 : administrator_info Database Table

2. student_info

Description: This table stores the information of the student

Fields	Data Type	Description
stud_id	Int	Student ID (auto number)
stud_name	Text	Student's name
stud_no_matric	Varchar	Student's matric number
stud_gender	Text	Student's gender
stud_major	Text	Student's majoring
stud_email	Varchar	Student's email address

stud_login_name	Varchar	Student's login name
stud_password	Varchar	Student's login password
Active	Yes/No	Check the login status
LastLogin	Date/Time	Student Last Login time
CourseID1	Number	Course ID 1
CourseID2	Number	Course ID 2
CourseID3	Number	Course ID 3
CourseID4	Number	Course ID 4
CourseID5	Number	Course ID 5

Table 4.2 : student_info Database Table

3. lecturer_info

Description: This table stores the information of the lecturer

Fields Name	Data Type	Description
lect_id	Int	Lecturer ID (auto number)
lect_name	Varchar	Lecturer name
lect_email	Varchar	Lecturer email address
lect_login_name	Varchar	Lecturer login name
lect_password	Varchar	Lecturer login password
Active	Yes/No	Check login status
LastLogin	Date/Time	Check last login time

Table 4.3 : lecturer_info Database Table

4. fsktm_course

Description: This table stores the information of all the courses of FSKTM

Fields	Data Type	Description
CourseID	Int	Course ID (auto number)
subj_name	Varchar	The name of the course
Subj_code	Varchar	The code of the course

subj_code1	Varchar	Alternative course code
subj_code2	Varchar	Alternative course code
subj_code3	Varchar	Alternative course code
subj_code4	Varchar	Alternative course code
lect_id	Int	Lecturer ID
Course_status	varchar	Status of the course

Table 4.4 : fsktm_course Database Table

5. registration

Description: This table store the information of courses registered by student

Fields	Data Type	Description
course_id	Int	Course ID
stud_id	Int	Student ID

Table 4.5 : registration Database Table

6. bank_obj_ques

Description: This table is used to store the Objective question for quiz

Fields	Data Type	Description
quizobjID	Int	Question number (auto number)
CourseID	Int	Course ID
obj_ques	Text	Objective question
obj_A	Text	Objective Option A
obj _B	Text	Objective Option B
obj_C	Text	Objective Option C
obj_D	Text	Objective Option D
obj_answer	Varchar	Objective answer
ques_status	Text	Question status

Table 4.6 : bank_obj_ques Database Table

7. bank_obj_quesT

Description: This table is used to store the Objective question for test

Fields	Data Type	Description
testobjID	Int	Question number (auto number)
CourseID	Int	Course ID
obj_ques	Text	Objective question
obj_A	Text	Objective Option A
obj _B	Text	Objective Option B
obj_C	Text	Objective Option C
obj_D	Text	Objective Option D
obj_answer	Varchar	Objective answer
ques_status	Text	Question status

Table 4.7 : bank_obj_quesT Database Table

8. bank_fill_ques

Description: This table is used to store Fill In The Blank question for test

Fields	Data Type	Description
testfillID	Int	Question number (auto number)
CourseID	Int	Course ID
fill_ques	Text	Fill in the blank question
fill_answer	Varchar	Fill in the blank answer
ques_status	Text	Question status

Table 4.8 : bank_fill_ques Database Table

9. bank_fill_quesQ

Description: This table is used to store Fill In The Blank question for quiz

Fields	Data Type	Description
quizfillID	Int	Question number (auto number)
CourseID	Int	Course ID

fill_ques	Text	Fill in the blank question
fill_answer	Varchar	Fill in the blank answer
ques_status	Text	Question status

Table 4.9 : bank_fill_quesQ Database Table

10. bank_TrueFal_ques

Description: This table is used to store True and False question for test

Fields	Data Type	Description
testTFID	Int	Question number (auto number)
CourseID	Int	Course ID
TF_state	Text	True and False question
TF_answer	Varchar	True and False answer
ques_status	Text	Question Status

Table 4.10 : bank_TrueFal_ques Database Table

11. bank_TrueFal_quesQ

Description: This table is used to store True and False question for quiz

Fields	Data Type	Description
QuizTFID	Int	Question number (auto number)
CourseID	Int	Course ID
TF_state	Text	True and False question
TF_answer	Varchar	True and False answer
ques_status	Text	Question Status

Table 4.11 : bank_TrueFal_quesQ Database Table

12. bank_struc_ques

Description: This table is used to store Structure question for tutorial

Fields	Data Type	Description
tutstructID	Int	Question number (auto number)
CourseID	Int	Course ID
struc_ques	Text	Structure question
struc_point	Int	Structure point
ques_status	Text	Question status

Table 4.12 : bank_struc_ques Database Table

13. bank_struc_quesas

Description: This table is used to store Structure question for assignment

Fields	Data Type	Description
assignstructID	Int	Question number (auto number)
CourseID	Int	Course ID
struc_ques	Text	Structure question
struc_point	Int	Structure point
ques_status	Text	Question status

Table 4.13 : bank_struc_quesas Database Table

14. bank_essay_ques

Description: This table is used to store Essay question for tutorial

Fields	Data Type	Description
tutessayID	Int	Question number (auto number)
CourseID	Int	Course ID
essay_ques	Text	Essay question
essay_point	Int	Essay point
ques_status	Text	Question status

Table 4.14 : bank_essay_ques Database Table

15. bank_essay_quesas

Description: This table is used to store Essay question for assignment

Fields	Data Type	Description
assignessayID	Int	Question number (auto number)
CourseID	Int	Course ID
essay_ques	Text	Essay question
essay_point	Int	Essay point
ques_status	Text	Question status

Table 4.15 : bank_essay_quesas Database Table

16. test_paper_info

Description: This table is used to store the information of the Test Paper

Fields	Data Type	Description
testpaper_id	Int	Test paper ID (auto number)
CourseID	Int	Course ID
testdate	Varchar	The date of Test
duration	Varchar	Duration of the Test paper
start_time	Varchar	Starting time of the Test paper
test_password	Varchar	Password for test
test_name	Varchar	Name of the test

Table 4.16 : test_paper_info Database Table

17. quiz_paper_info

Description: This table is used to store the information of the Quiz Paper

Fields	Data Type	Description
quizpaper_id	Int	Quiz paper ID (auto number)
CourseID	Int	Course ID
quizdate	Varchar	The date of Quiz

duration	Varchar	Duration of the Quiz paper
start_time	Varchar	Starting time of the Quiz paper
quiz_password	Varchar	Password for quiz
quiz_name	Varchar	Name of the quiz

Table 4.17 : quiz_paper_info Database Table

18. tut_info

Description: This table is used to store the information of the tutorial

Fields	Data Type	Description
tut_id	Int	Tutorial ID (auto number)
CourseID	Int	Course ID
total_point	Int	Total score of the tutorial/assignment paper
passupdate	Date/Time	Date line to pass up tutorial
tutname	Text	Name of Tutorial

Table 4.18 : tut_info Database Table

19. assign_info

Description: This table is used to store the information of the assignment

Fields	Data Type	Description
assign_id	Int	Assignment ID (auto number)
CourseID	Int	Course ID
total_point	Int	Total score of the assignment paper
passupdate	Int	Date line to pass up assignment
assign_name	Text	Name of assignment

Table 4.19 : assign_info Database Table

20. test_obj_ques

Description: This table is used to store the Objective question of the Test paper

Fields	Data Type	Description
testobjpaperID	Int	Question number (auto number)
testpaper_id	Int	Test paper ID
testobjID	Int	Objective question ID for test
testobjpoint	Int	The score of the objective question

Table 4.20: test_obj_ques Database Table

21. quiz_obj_ques

Description: This table is used to store the Objective question of the Quiz paper

Fields	Data Type	Description
quizobjpaperID	Int	Question number (auto number)
quizpaper_id	Int	Quiz paper ID
quizobjID	Int	Objective question ID for quiz
quizobjpoint	Int	The score of the objective question

Table 4.21: quiz_obj_ques Database Table

22. test_fill_ques

Description: This table is used to store the Fill In The Blank question of the Test Paper

Fields	Data Type	Description
testfillpaperID	Int	Question number (auto number)
testpaper_id	Int	Test paper ID
testfillID	Text	Fill In The Blank question ID for test
testfillpoint	Int	The score of the Fill In The Blank question

Table 4.22 : test_fill_ques Database Table

23. quiz_fill_ques

Description: This table is used to store the Fill In The Blank question of the Quiz Paper

Fields	Data Type	Description
quizfillpaperID	Int	Question number (auto number)
quizpaper_id	Int	Quiz paper ID
quizfillID	Text	Fill In The Blank question ID for quiz
quizfillpoint	Int	The score of the Fill In The Blank question

Table 4.23 : quiz_fill_ques Database Table

24. test_TrueFal_ques

Description: This table is used to store the True and False question of the Test Paper

Fields	Data Type	Description
testTFpaperID	Int	Question number (auto number)
testpaper_id	Int	Test paper ID
testTFID	Int	True and False question ID for test
testTFpoint	Int	The score of the True and False question

Table 4.24 : test_TrueFal_ques Database Table

25. quiz_TrueFal_ques

Description: This table is used to store the True and False question of the Quiz Paper

Fields	Data Type	Description
quizTFpaperID	Int	Question number (auto number)
quizpaper_id	Int	Quiz paper ID
quizTFID	Int	True and False question ID for quiz
quizTFpoint	int	The score of the True and False question

Table 4.25 : quiz_TrueFal_ques Database Table

26. tut_struc_ques

Description: This table is used to store the Structure question of the Tutorial Paper

Fields	Data Type	Description
tutstructpaperID	Int	Question number (auto number)
tut_id	Int	Tutorial paper ID
tutstructID	Int	Structure question ID for tutorial
tutstructpoint	Int	The score of the structure question

Table 4.26 : tut_struc_ques Database Table

27. assign_struc_ques

Description: This table is used to store the Structure question of the Assignment Paper

Fields	Data Type	Description
assignstructpaperID	Int	Question number (auto number)
assign_id	Int	Assignment paper ID
assignstructID	Int	Structure question ID for assignment
assignstructpoint	Int	The score of the structure question

Table 4.27 : assign_struc_ques Database Table

28. tut_essay_ques

Description: This table is used to store the Essay question of the Tutorial Paper

Fields	Data Type	Description
tutessaypaperID	Int	Question number (auto number)
tut_id	Int	Tutorial/Assignment paper ID
tutessayID	Int	Essay question ID for tutorial
tutessaypoint	Int	The score of the essay question

Table 4.28 : tut_essay_ques Database Table

29. assign_essay_ques

Description: This table is used to store the Essay question of the Assignment Paper

Fields	Data Type	Description
assignessaypaperID	Int	Question number (auto number)
assign_id	Int	Tutorial/Assignment paper ID
assignessayID	Int	Essay question ID for tutorial
assignessaypoint	Int	The score of the essay question

Table 4.29 : assign_essay_ques Database Table

30. test_obj_answer

Description: This table is used to store student's objective answer of Test

Fields	Data Type	Description
testobjID	Int	Objective question ID for test
stud_id	Int	Student ID
testpaper_id	Int	Test paper ID
obj_answer	Text	Student's objective answer
stud_point	Int	The score of the student

Table 4.30 : test_obj_answer Database Table

31. quiz_obj_answer

Description: This table is used to store student's objective answer of Quiz

Fields	Data Type	Description
quizobjID	Int	Objective question ID for quiz
stud_id	Int	Student ID
quizpaper_id	Int	Quiz paper ID
obj_answer	Text	Student's objective answer
stud_point	Int	The score of the student

Table 4.31 : quiz_obj_answer Database Table

32. test_fill_answer

Description: This table is used to store student's fill in the blank answer of Test

Fields	Data Type	Description
testfillID	Int	Fill In the Blank question ID for test
stud_id	Int	Student ID
testpaper_id	Int	Test paper ID
fill_answer	Text	Student's Fill in the blank answer
stud_point	Int	The score of the student

Table 4.32 : test_fill_answer Database Table

33. quiz_fill_answer

Description: This table is used to store student's fill in the blank answer of Quiz

Fields	Data Type	Description
quizfillID	Int	Fill In the Blank question ID for quiz
stud_id	Int	Student ID
quizpaper_id	Int	Quiz paper ID
fill_answer	Text	Student's Fill in the blank answer
stud_point	Int	The score of the student

Table 4.33 : quiz_fill_answer Database Table

34. test_TrueFal_answer

Description: This table is used to store student's True and False answer of Test

Fields	Data Type	Description
testTFID	Int	True and False question ID for test
stud_id	Int	Student ID
testpaper_id	Int	Test paper ID
TF_answer	Text	Student's True and False answer
stud_point	Int	The score of the student

Table 4.34 : test_TrueFal_answer Database Table

35. quiz_TrueFal_answer

Description: This table is used to store student's True and False answer of Quiz

Fields	Data Type	Description
QuizTFID	Int	True and False question ID for quiz
stud_id	Int	Student ID
quizpaper_id	Int	Quiz paper ID
TF_answer	Text	Student's True and False answer
stud_point	Int	The score of the student

Table 4.35 : quiz_TrueFal_answer Database Table

36. tut_struc_answer

Description: This table is used to store student's structure answer of Tutorial

Fields	Data Type	Description
StudAnswerID	Int	Student's answer ID (Auto Number)
TutstructID	Int	Structure question ID for tutorial
stud_id	Int	Student ID
tut_id	Int	Tutorial paper ID
struc_answer	Text	Student's structure answer
stud_point	Int	The score of the student

Table 4.36 : tut_struc_answer Database Table

37. assign_struc_answer

Description: This table is used to store student's structure answer of Assignment

Fields	Data Type	Description
StudAnswerID	Int	Student's answer ID (Auto Number)
assignstructID	Int	Structure question ID for assignment
stud_id	Int	Student ID
assign_id	Int	Tutorial paper ID

struc_answer	Text	Student's structure answer
stud_point	Int	The score of the student

Table 4.37 : assign_struc_answer Database Table

38. tut_essay_answer

Description: This table is used to store student's essay answer of Tutorial

Fields	Data Type	Description
StudAnswerID	Int	Student's answer ID (auto number)
tutessayID	Int	Structure question ID for assignment
stud_id	Int	Student ID
tut_id	Int	Tutorial paper ID
essay_answer	text	Student's essay answer
stud_point	Int	The score of the student

Table 4.38 : tut_essay_answer Database Table

39. assign_essay_answer

Description: This table is used to store student's essay answer of Assignment

Fields	Data Type	Description
StudAnswerID	Int	Student's answer ID (auto number)
assignessayID	Int	Essay question ID for assignment
stud_id	Int	Student ID
assign_id	Int	Assignment paper ID
essay_answer	Text	Student's essay answer
stud_point	Int	The score of the student

Table 4.39 : assign_essay_answer Database Table

4.4 USER INTERFACE DESIGN

User interface design is one of the most important aspects of SCES development process. The following are some of the consideration taken in designing the user interface of web pages.

- Ease of Use
  - Use bulleted items for replacing long paragraphs. This will help the user to search for the information quickly and easily.
  - Break up the long documents into small, modular section that are easier to navigate through.
- Consistency
  - Consistency brings a sense of identity to web pages. Users can search for information in a faster way when they are familiar with particular web page layout.
- Performance Issues
  - In order to make performance better, the developer must avoid using too many graphics on web pages. Graphics are only included when it can enhance the communication of information

4.4.1 SCES Screen Design

The main goal of developer is to translate user requirement into the design of the web application. Figure 4.3, 4.4, 4.5 and 4.6 illustrate some of the screen design of SCES.

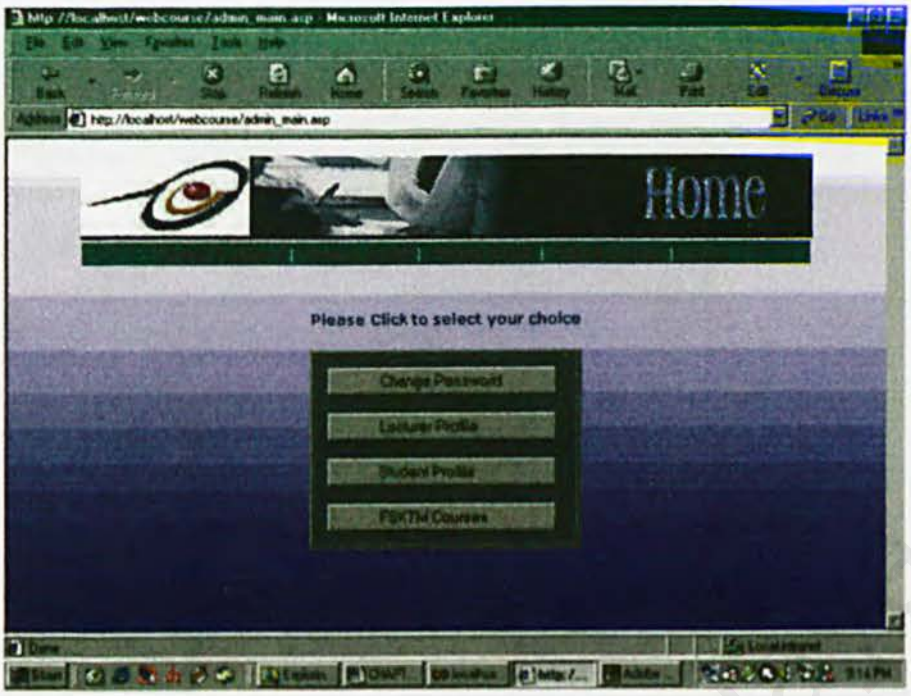

Figure 4.3 Administrator Section Screen Design

Figure 4.4 Administrator Change Password Design

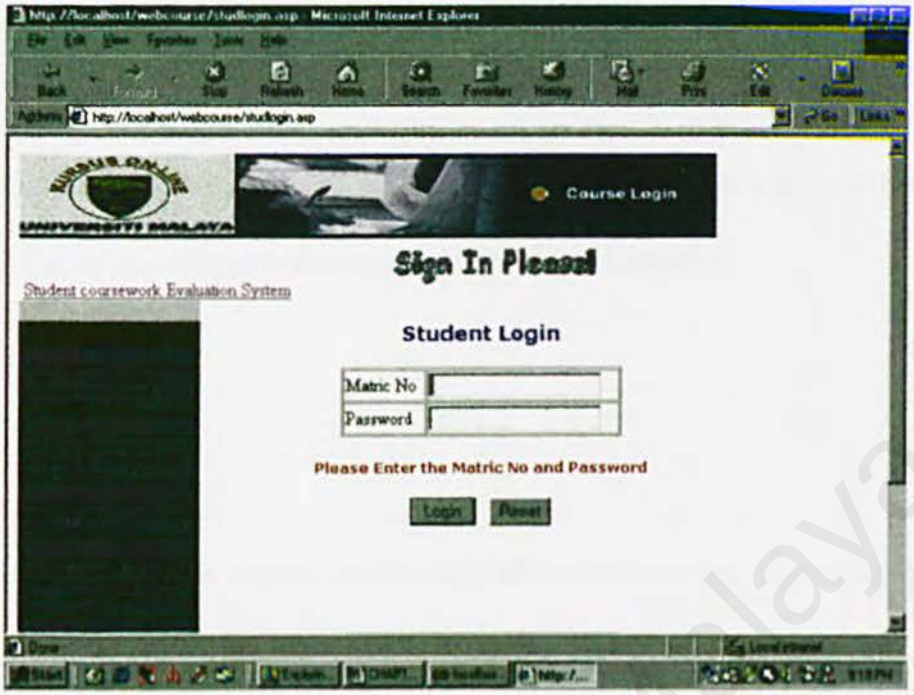

Figure 4.5 Student Login Screen Design

Figure 4.6 FSKTM Courses Screen Design

4.5 PROCESS DESIGN

The system is structured into a number of principal sub-systems where a sub-system is an independent unit. Communications between sub-systems are identified.

4.5.1 Structure Chart

Decomposing a system into a set of interacting sub-systems is an important phase. Structure chart is used to depict the high level extraction of a specified system. The usage of structure chart is to describe the interaction between independent sub-systems.

SCES is divided into three major components: General Section, Student Section and Lecturer Section. The details of each section is represented in the structure charts below:

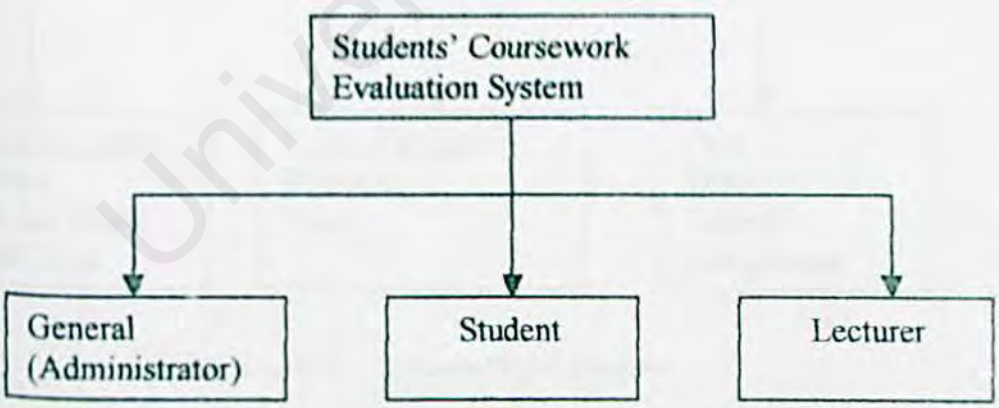

Figure 4.8 Main Structure Chart for SCES

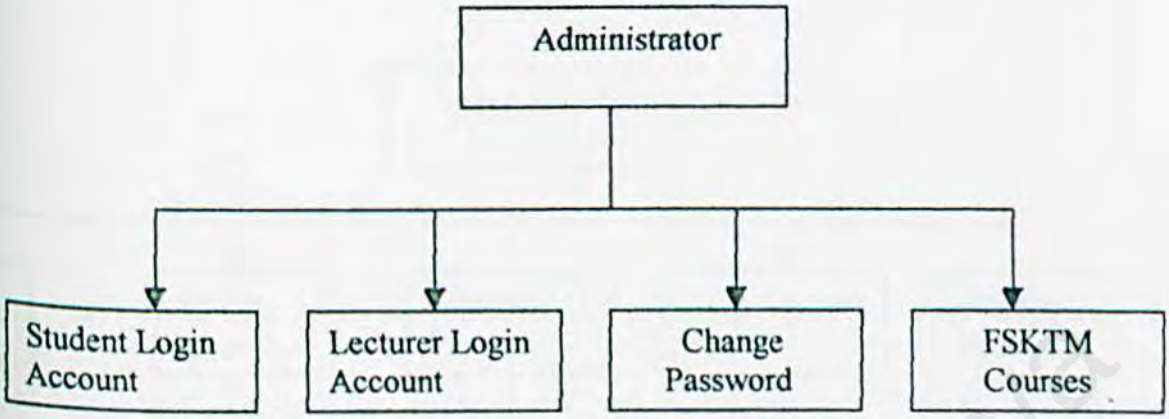

Figure 4.9 Structure for Administrator

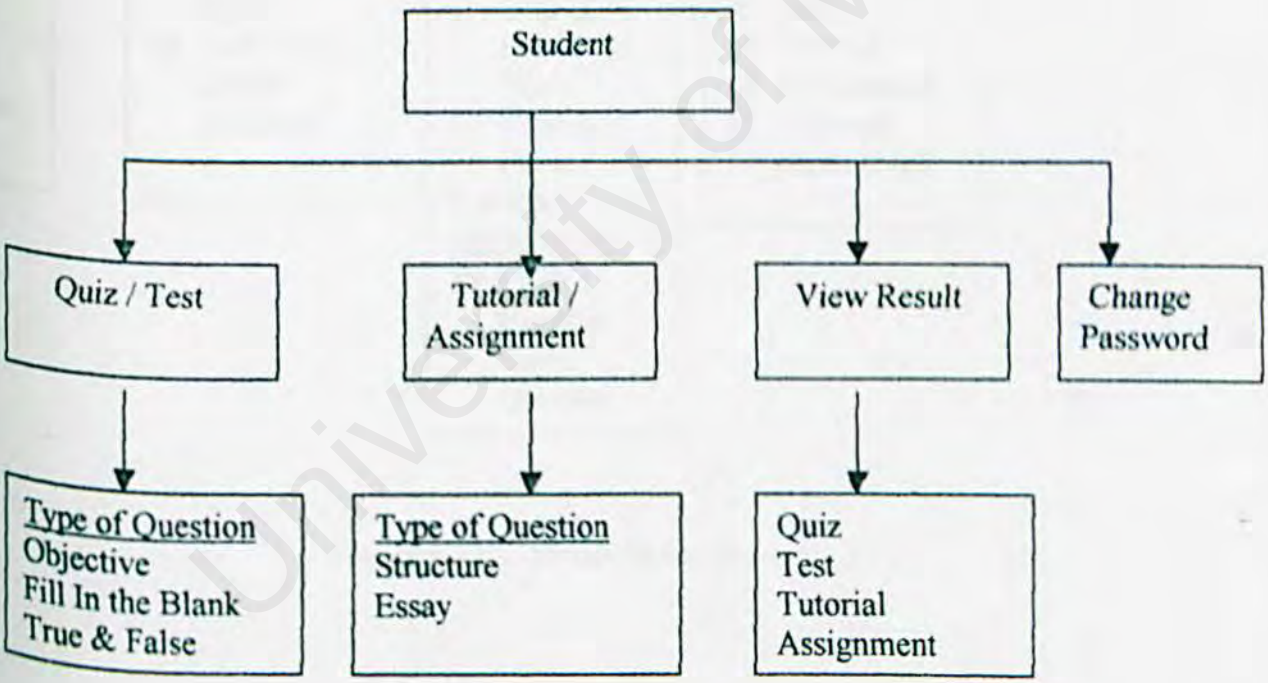

Figure 4.10 Structure for Student

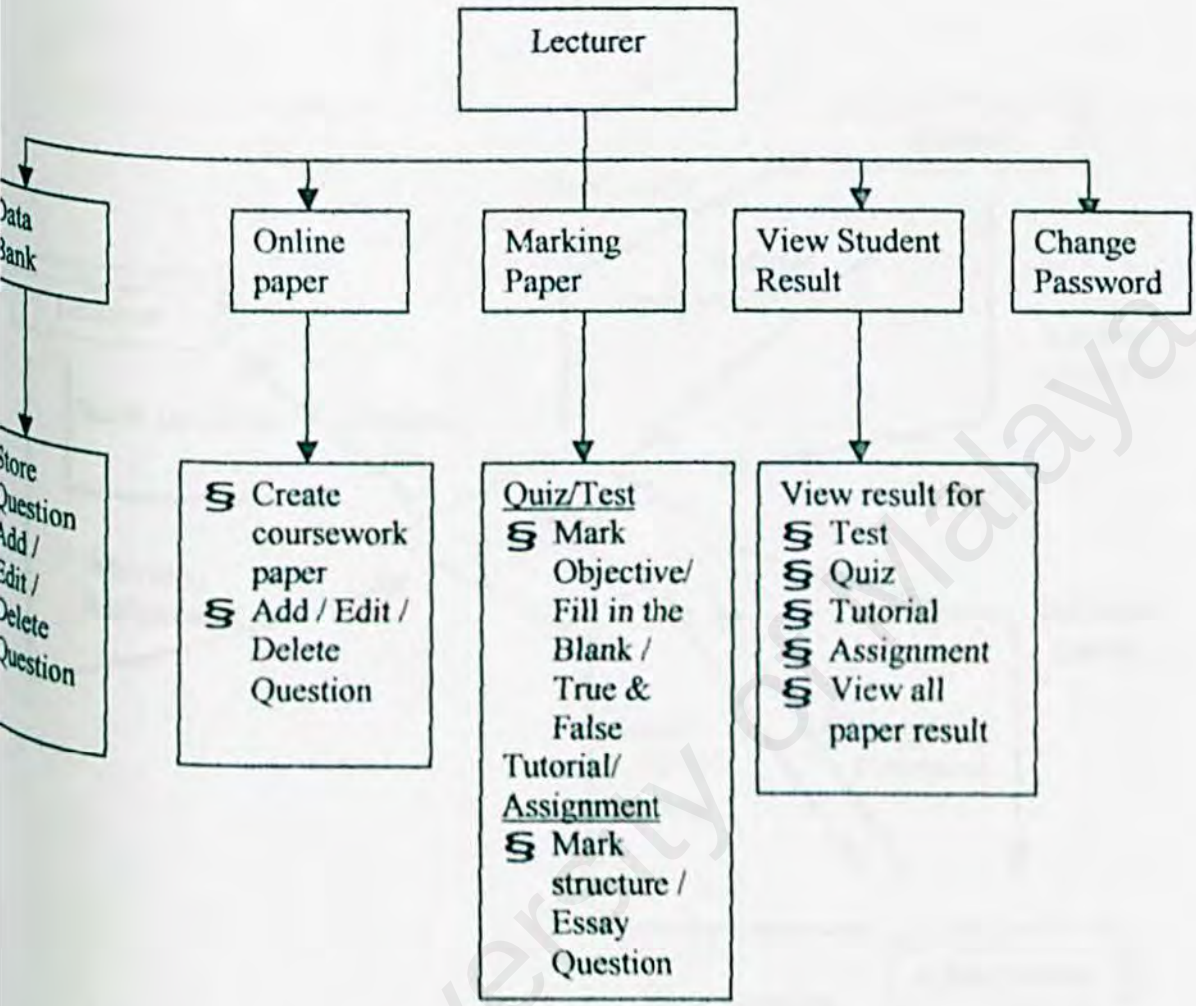

Figure 4.11 Structure for Lecturer

4.5.2 Context Diagram

Figure below show the Context Diagram for Students' Coursework Evaluation System

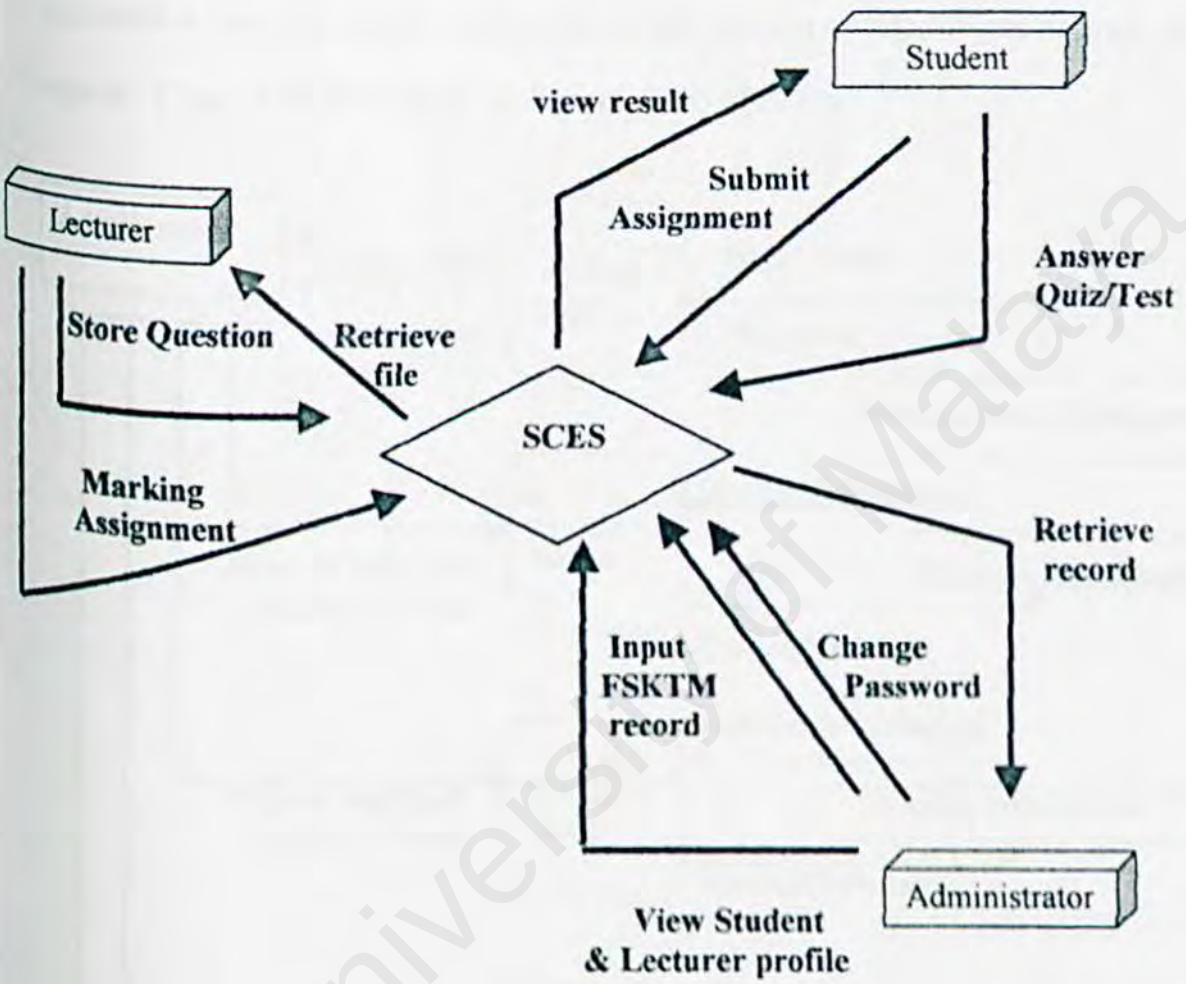

Figure 4.12 Context Diagram for Students' Coursework Evaluation System

4.5.3 Data Flow Diagram

Data flow diagrams (DFD) depict the broadest possible overview of system inputs, processes and outputs. It able to conceptualize how the data moves through the organization, the processes or transformation that the data undergoes, and what are the outputs. Figure 4.13, 4.14 and 4.15 show the DFD of SCES.

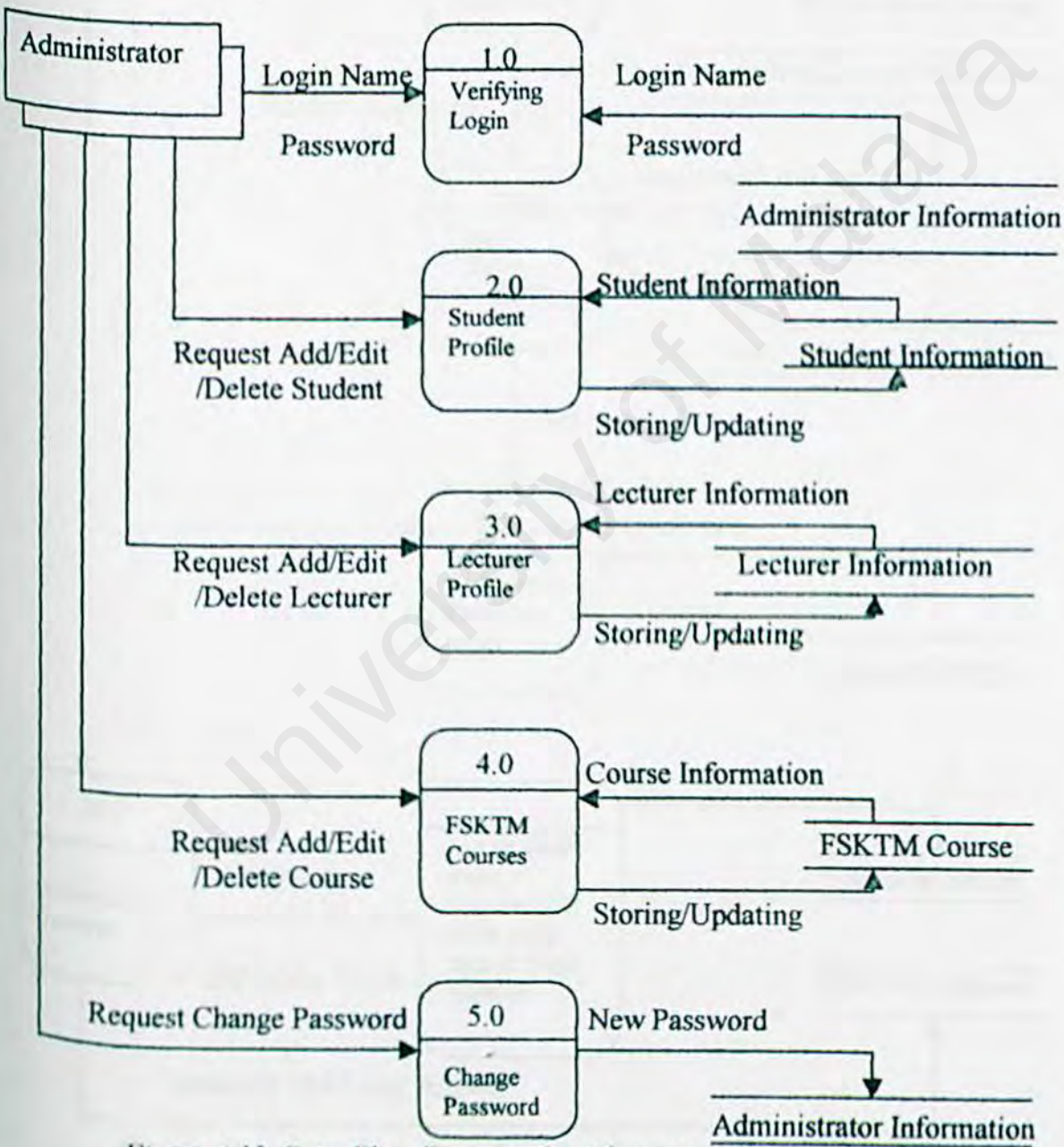

Figure 4.13 Data Flow Diagram for Administrator Section

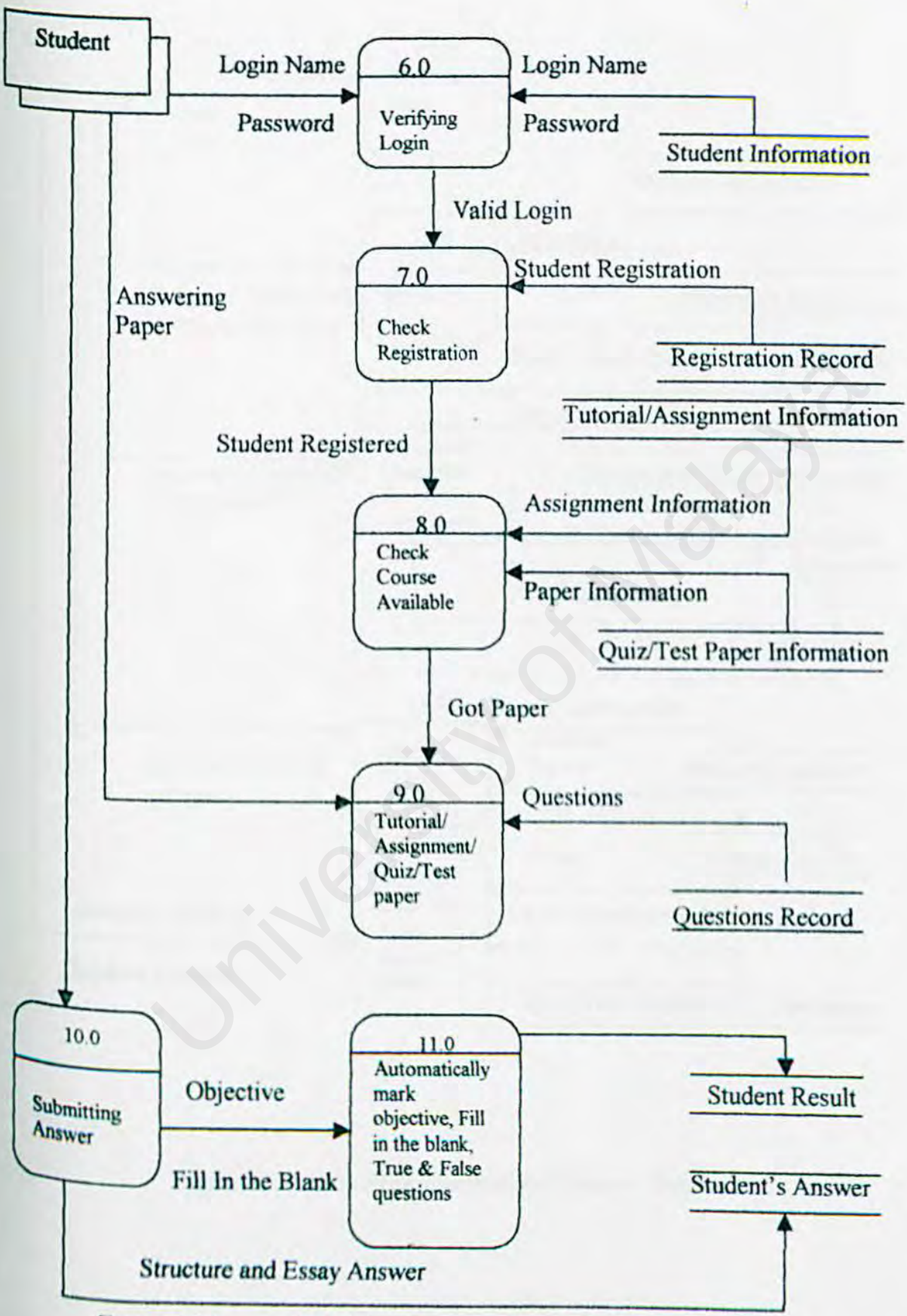

Figure 4.14 Data Flow Diagram for Student Section

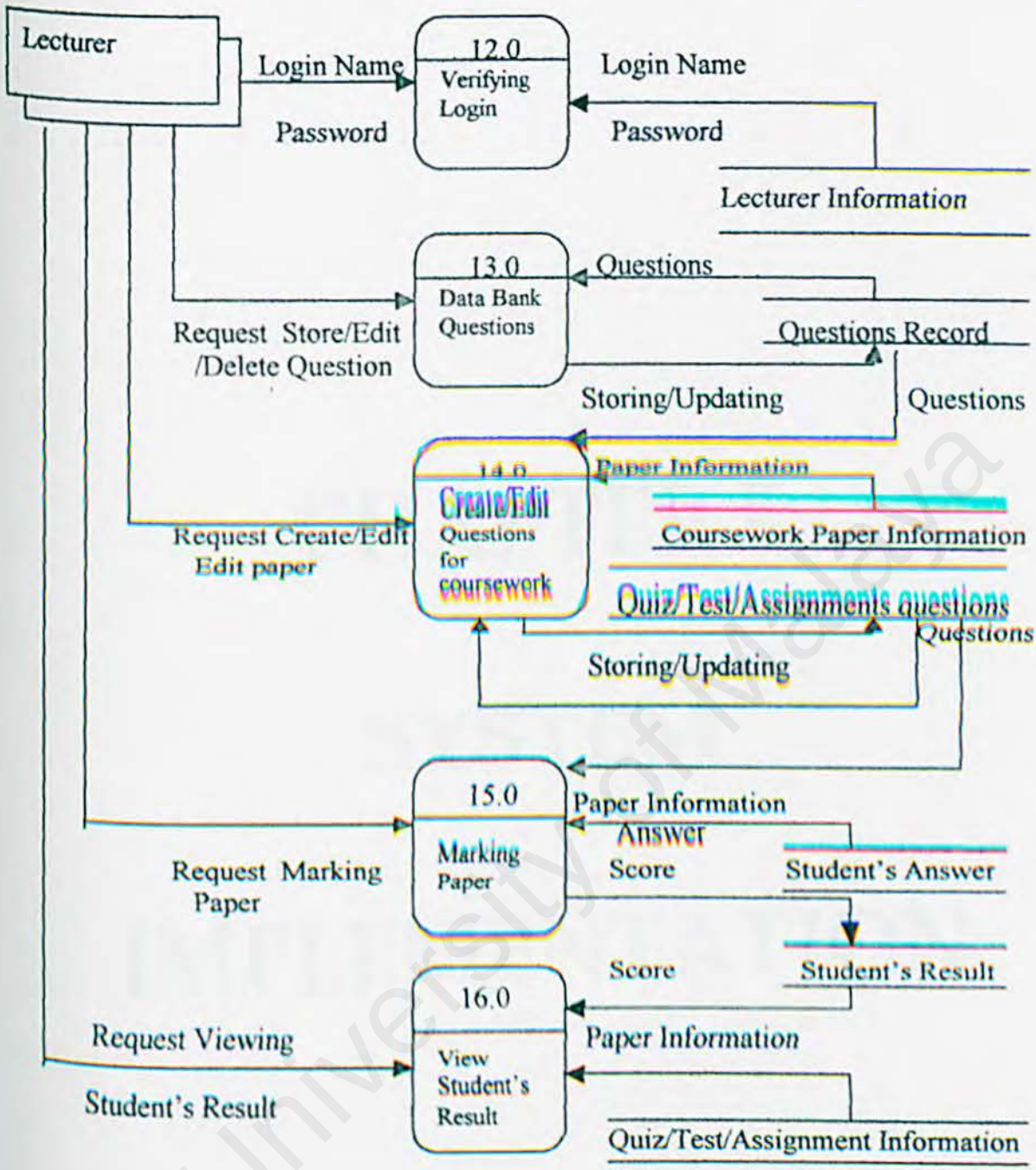

Figure 4.15 Data Flow Diagram for Lecturer Section

CHAPTER 5 SYSTEM IMPLEMENTATION

System implementation converts the system requirements and design into the program codes. Modifications have been made to the previous design specified in the system design phase. The logical design of the system is converted into a form that can be interpreted by the machine. Besides, testing is performed to ensure the reliability and quality of the system.

5.1 DEVELOPMENT ENVIRONMENT

During the development process, the hardware specifications that have been used to develop the SCES are stated in table 5.1. The software specifications that have been used to develop the SCES are stated in table 5.2. Meanwhile, the software tools that have been used for the documentation of SCES are stated in table 5.3.

5.1.1 Hardware Specifications

Processor	233 MHz Pentium II
Memory	96 MB SDRAM
Hard Disk	10.2 GB Hard Disk
Others	512K Pipeline Burst Cache
	1.44 MB Floppy Drive
	Keyboard and mouse as input device

Table 5.1 Hardware Specification in Development Environment

5.1.2 Software Specifications

1	System Requirements
-	Microsoft Window 98 (Operating system)
2	Database
-	Microsoft Access 2000 (Database server)
-	ODBC 32 bit Driver (Connect database with web server)
3	System Development
-	Microsoft Visual InterDev 6.0 (Web Application Development Tool)
-	Internet Explorer 4.0 (View web page developed)
4	Interface Design
-	Microsoft Front Page 2000 (ASP document layout design)
-	Microsoft Image Composer 1.5 (Image design and manipulation)

Table 5.2 Software Specifications in Development Environment software specifications

5.1.3 Software Tools

1	Report Writing
-	Microsoft Word 2000
2	System Model, chart and diagram drawing
-	Visio Professional 5.0 for Microsoft Windows
3	System Interface Figures
-	Microsoft Image Composer 1.5
-	Internet Explorer 4.0 (View web page developed)

Table 5.3 Software Tools for Documentation

5.2 CODING

SCES is developed modularly using the top-down approach. In the previous phases, the system has been separate into modules. Each module has been separate into modules. Each module has a clearly stated purpose. The coding begins with building the high level modules that are then refined into the functions and procedures.

5.3 DEVELOPMENT OF SCES

Microsoft Visual InterDev 6.0 is used as the web application development tool for SCES. The programming technology used to developed SCES is Active Server Pages (ASP). Microsoft Access 2000 is the database management system used to store data in SCES. Microsoft Image Composer 1.5 was used to design images.

The web pages in SCES are coded in HTML and ASP document. Three languages used to developed the document, HTML, VBScript and JavaScript. The server side scripts in the document enable two server-side processing such as retrieve or manipulate data in the database. Meanwhile, the client-side scripts enable the client-side processing that mostly focus on the user data input validation.

During the coding process, determine and separate the server-side and client-side source codes as well as the languages used are the crucial part. Source code in the client-side are delimited by using <Script>.....</Script> tags. For server-side function, the

<Script>....</Script> tags are used but Runat must set to the server. In order to differentiate the JavaScript and VBScript, the language being used in between the two tags must be specified in the beginning tag. Source codes in the server-side are delimited using delimiters <%.....%>

In the early stage of implementation, data validation was written using VBScript at the server-side. All data input were sent over to the server and being checked and analyzed. If the data input contained any errors such as wrong data type, the results and data will be sent back to the client machine to enable the user to correct the error. In order to reduce the server-side processing, the coding of validation of input has been changed to the client-side.

Most of the user data input validations are coded in client-side so that the data checking is done before the passed over the server. Thus, the server-side processing can be reduced. The system performance can be enhanced. Though VBScript can also be used in the client-side scripting, it has browser limitation. Therefore, JavaScript was chosen because of its flexibility. Microsoft Internet Explorer as well as Netscape can support it.

5.3.1 Microsoft Visual InterDev 6.0

At the initial stage of development phase, developer is required to create a web project for the system using Visual InterDev 6.0. SCES appropriately use some of the Visual InterDev 6.0 features and technologies in creating, editing, deploying and managing its web site. Visual InterDev 6.0 combines a rich set of database connectivity tools, wizards, and design-time controls to increase the functionality and decrease the development time

to build Active Server Applications. Some of the features of Visual InterDev 6.0 are listed below:

- RAD Environment

  The new IDE provides a complete set of rapid application development (RAD) tools to let professional developer design, build, debug and deploy data-driven web application faster than before. These include: source code preserving WYSIWYG page editor with full support for dynamic HTML, complete and end-to-end debugging tools for both client and server side code as well as site design and management tools.

- Integrated Database Tools

  Visual InterDev 6.0 provides a complete set of tools for integrating databases with dynamic web application. Database features include drug and drop blinding of database to HTML forms and reports, database design tools for creating and modifying SQL Server databases.

- Improved Web Application Programming Model

  Visual InterDev 6.0 simplifies the inherent complexities of building web application by providing an intuitive programming model includes: Object-based and event driven programming, simple consistent programming model for both broad-reach and dynamic HTML-based application.

5.3.2 Scripting Language

5.3.2.1 VBScript

Visual Basic Scripting Edition, known as VBScript, enable the authors to create scripts using a subset of the Microsoft Visual Basic language. VBScript is implemented as a

fast, portable interpreter for use in web browsers and applications that use ActiveX controls, Java applets and OLE Automation Servers.

VBScript is a strict subset of the Visual Basic for applications language that is used in the popular applications such as Microsoft Excel, Microsoft Access, Microsoft Project and Visual Basic 4.0 development system. VBScript was designed to be fast, so it does not support the use of functionality that directly accessed the client machine's operating system or file system. For example, you cannot do file I/O or read the registry on the client machine.

Until now, VBScript was a useful, lightweight scripting language that could manipulate, control and process objects in a HTML web page. VBScript provides unlimited programming flexibility at the web-browser level without relying on a specific browser type.

5.3.2.2 JavaScript

JavaScript is a variation of the popular Java language which can be integrated directly into HTML pages or Active Server Pages. JavaScript is a scripting language written by Netscape that preceded the European Computer Manufacturers Association (ECMA) Standard and is the first web Scripting language to hit market. It is syntactically identical to Java that is based on C++, but its an interpreted language as compare to Java, which is a compiled language.

JavaScript is tied to the HTML pages. The code is embedded in it and it operates on the HTML elements. Since code are interpreted by a browser, it is anticipated that the HTML editors will add features for creating the JavaScript code. JavaScript works in any version of Netscape Navigator 2.0 and above as well as any version of Microsoft Internet Explorer and above. Microsoft's implementation of JavaScript is called Jscript.

The excitement of animation sound and interactivity is easily accomplished using this technology. And since JavaScript is downloaded as part of a web page, there is no delay in waiting for a JavaScript module to download and begin running. Most browsers recognize JavaScript.

5.4 TESTING

Testing plays an important role in the system development process to assure the quality of a system. Testing is an ultimate review of the specification, design and coding.

The main objectives of testing a system are stated as the following:

1) Find as-yet-uncovered error
2) Demonstrates the software function to be working according to the specification and performance requirements appear to have been met.
3) Indicate the system readability and quality as a whole.

Testing performance in SCES development process is to ensure all possible errors in the system have been discovered and corrected. The strategies used for testing SCES are unit testing, integration testing and system testing.

5.4.1 Unit Testing

In unit testing, each program component such as module is tested on its own, isolated from the components in the system. Unit testing is used to verify the component built is functioning as expected.

In the development of SCES, unit testing is done concurrently with the prototyping phase. Each module is tested to ensure it can operate appropriately within the boundary established to restrict processing. For example, the test displayed for one student should be of the course that the student takes. The testing should ensure the module will performed the error-handling process whenever the error occurs.

5.4.2 Integration Testing

When the collection of components have been unit-tested, the next step performed in the SCES testing was to ensure the interfaces among the components such as module calling sequence are defined and handled properly. Integration testing is the process of verifying that the system components work together as described in the system and program design specifications.

5.4.3 System Testing

System testing is used to test the SCES system as a whole when the entire system is validated and combined with the system elements such as hardware, end-user and database. This testing is used to verify all elements in SCES system are able to function as expected. For example, system testing is used to ensure SCES has achieved the reliability, flexibility and accuracy specified in the system requirement specifications.

5.4.4 White-Box Testing

White-box testing is a test case design method that uses the control structure of the procedural design to derive the test cases. By using white-box testing methods, the test cases that can be derive are stated as the following:-

1) Exercise all logical decisions on SCES True and False sides.
2) Exercise all loops at their boundaries and within their operational bounds.
3) Exercise internal data structures to assure their validity.
4) Guarantee that all independent paths within a module have been exercised at least once.

5.4.5 Black-Box Testing

Black box testing focuses on the functional requirements of the software. A set of input conditions can be derived by black box testing. These conditions will fully exercise all

the functional requirements for SCES. Black box testing is an approach to uncover a difficult class of errors than white box testing methods. Black box testing attempts to find errors in the following categories:-

1) Interface errors
2) Incorrect or missing functions
3) Performance errors
4) Initialization and termination errors

5.4.6 Database Testing

The accuracy and integrity of data stored by the server is tested. Transactions posted by SCES are examined to ensure that data are properly stored, update and retrieved.

CHAPTER 6 SYSTEM EVALUATION AND CONCLUSION

During the system evaluation phase, the evaluation on the system developed has been carried out. Problems encountered during the system development, the strengths and limitations of the system as well as future enhancements that can be done on the system are stated as the following.

6.1 PROBLEM ENCOUNTERED AND SOLUTION

Several problems were faced throughout the development of SCES. Most of the problems have been solved eventually. Experiences gained while trying to find a solution for a problem. The following are the problems encountered during the system development process.

6.1.1 Lack of knowledge on web-based programming

This is a major problem as the concept of web-based programming is very much different from the normal stand-alone programming. The new exposure of the new technologies or product such as ASP, ActiveX, Personal Web Server and Microsoft Access 2000 has increased the learning curve before starting the development of SCES.

Surfing the net for information and reading up on the concept of client-server and Internet programming which included the operation of web-server, were some of the approaches taken to overcome this problem. Most of the ambiguities are resolved by reading up on relevant materials and most importantly advice and guidance from course mates and experienced senior.

6.1.2 Difficulty in choosing development technology, programming language and tools

There are many ways and tools available to develop a web-based system. Choosing a suitable technology and tool proves to be a critical process as all tools has its strengths and weaknesses. Besides, availability of the required tool for development is also a major consideration.

To determine which approach to use, discussion with course mates engaging in similar project are carried out. Seeking advices and view from senior also been carried out. Further more, surfing through the Internet helps to clarify some doubts had been done.

6.1.3 Failure in controlling date display format

Most common data format used in Malaysia is in United Kingdom style (dd/mm/yyyy), but unfortunately this could not be done by VBScript. In which, VBScript supports the United States style as in (mm/dd/yyyy).

To overcome this problem, all the date displaying in SCES system are in the format of (mm/dd/yyyy).

6.2 STRENGTHS OF THE SYSTEM

6.2.1 User-friendly Tool

SCES allows the users to perform their functions in a user-friendly environment. Graphics and images enhance the user friendliness of the system. Adequate instructions, messages and responses given by the system provide the guidance to the users while using the system. The training cost and learning curve of the user can be reduced.

6.2.2 Ease of use Graphical User Interface

SCES provides easy to use graphical user interface. Most of the functions in SCES can be performed by point and click using the mouse, hence the user can navigate from page to page easily.

6.2.3 Security

Security features are presented in SCES. The users have to login using the User ID and password to gain access to the admin, lecturer and student section. All functions in the

admin, lecturer and student section can only be performed after a user has login successfully. Besides, SCES will check the user's right when performing certain functions.

6.2.4 Total User Control

SCES permits the users to have full control on the system. The user can navigate to any pages and perform any functions that are available to them. The user can log out at any time they like after they have login to the system. The user can also close the browser if they want to close the connections to SCES as well as other connections on the internet.

6.2.5 System Transparency

The user only need to point and click the function or just input the complete information required by the function and the system will handle the processing for them without their intervention. The users do not need to know the system structure or how the system processes the functions.

6.2.6 Validation on Input Data

The system was developed to be robust enough to handle any invalid input into the system. Error messages will be displayed to guide the user whenever an invalid input is encountered.

6.2.7 Student and Lecturer Profile

The system enables the administrator to create, edit or delete the student and lecturer login account online. The administrator will give login name and password during creation of new user.

6.2.8 Automatically mark question

Objective, True and False as well as Fill In The Blank questions will automatically mark by the system after student has send their answer. The score will be generated automatically by the system and store in the database.

6.2.9 Creation of Web-Based Test/Quiz paper

The system enables the lecturer to create web-based test, quiz, tutorial and assignment paper, which can consist of different type of question.

6.2.10 Add question from Databank

While creating the test, quiz, tutorial and assignment paper, the lecturers are able to select the question from the Databank, which consist of all the questions that have been stored.

6.3 LIMITATION OF THE SYSTEM

6.3.1 No Report Printing Facilities

SCES does not have report printing facilities. Users cannot print report by using SCES such as students' result, students' information and etc. Users have to use the other printing facilities to print the page they navigate.

6.3.2 Do Not Support Audio and Video Data

SCES do not support the audio and video data. SCES can only display information in text and graphics.

6.3.3 Operating System and Browser Issue

Currently, user's working is limited to certain platform and terms of operating systems (only support Windows 95/98/NT) and internet browser (only support Microsoft Internet Explorer 4.0 and above).

6.3.4 Question Type

SCES can only support five types of question, which are Objective question, True and False question, Fill In The Blank, Structure question and Essay question. Besides, all the question type mentioned above cannot insert graphic or image.

6.4 FUTURE ENHANCEMENT

6.4.1 Integrating a Mail Server

SCES can be further enhanced with integrating a mail server to it so that the lecturers and students can send mail after login to the system.

6.4.2 Printing Facilities

As mentioned in the system limitations, SCES does not have any printing facilities. The SCES can be further enhanced with adding the printing facilities to it to enable report printing.

6.4.3 Video and Audio Data

Video and Audio data are not embedded in SCES. Hence the system can be further enhanced to enable lecturer put in audio and video test to make teaching more effective and attractive.

6.4.4 Browser Independent

In future, SCES should be able to support various types of Browser and not only limited to Microsoft Internet Explorer.

6.4.5 Countdown Timing

SCES should provide a countdown timing in student section, which can alert the student about the remaining time while answer test/quiz paper. Currently, SCES does not provide this facility due to time constraints.

6.4.6 Result Analysis

Future version of SCES should be able to display the analyzed data in graph such as Pie Chart, Bar Chart and etc. Besides, results analysis can be done for each of the paper type.

6.4.7 User Interface

The user interface of SCES is quite plain and some people will think that it may be not attractive enough. The enhancement can add in more graphics or animation images.

6.4.8 Connection and Data Security

SCES should improves the connection and data security like using Socket Secure Layer for the connection security, encryption for important data and using digital signature for authentication purposes.

6.5 CONCLUSION

The project has met its objective of developing a Students' Coursework Evaluation System for Faculty of Computer Science and Information Technology, University of Malaya, which were defined during the analysis stage and fulfills all the functional and non-functional requirements of the system. SCES is a fully operational web-based coursework system, which was found to be user-friendly, easily understood and effective.

However, SCES is developed for the use of one faculty. Nevertheless, the scope of SCES can be enhanced to facilitate the coursework program in a university.

Throughout the development process, valuable knowledge was gained from the complexities and intricacies of web programming. Among them are concepts of client/server, WWW and Internet, web technology and programming as well as configuring a web server and working with the Network Operating System. Programming in ASP, HTML and VBScript proves to be a valuable experience. Theories and knowledge gained throughout the course of computer science studies like System Analysis and Design and Software Engineering were literally put into practice.

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